THE
VETERINARY RECORD.

The Official Journal of the National Veterinary Medical Association of Great Britain and Ireland, Limited.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 5. JANUARY 31, 1925. VOL. 5.

Serum Immunity with Special Reference to the Serum Simultaneous Method of Immunisation against Rinderpest.*

By Captain S. L. SLOCOCK, M.C., F.R.C.V.S., R.A.V.C.

At present, from a clinical point of view, it must be admitted that serum therapy is most disappointing: we can easily provoke the production of antibodies to bacteria and substances which are of no practical importance, but frequently fail to produce any kind of useful immunity against more important bacteria.

I extract the following paragraph from Besson's *Practical Bacteriology and Serum Therapy*:—

"The sera of immunised animals may exhibit one or more or all of the following properties each quite independently of the other, and in different degrees.

1. Prophylactic and therapeutic properties.
2. Antitoxic properties.
3. Agglutination properties.
4. Bactericidal properties.
5. Sensitising properties."

The connection between the various properties of immune sera is not understood, and the small use we at present make of serum is almost entirely empirical. When we can understand and explain the connection between the different properties of sera we shall be in a position to derive the utmost benefit from serum immunity, and shall have progressed far towards stamping out many scourges, against which at present we are little more than powerless.

We know that artificial immunity may be either active or passive. Active immunity is comparatively slowly acquired, and only by giving the animal tissues actual bacterial experience, but the immunity so acquired is durable and for all practical purposes absolute.

If serum from an immune animal is injected into a susceptible animal the inoculated animal becomes protected against the disease, but in this case passive immunity only is conferred: the cells of the animal have taken no part in the process of immunisation. The serum which confers the immunity is treated as foreign matter by the inoculated animal, and as soon as it is eliminated the immunity ceases, and the animal again becomes susceptible. For this reason passive immunity is only of very temporary value in the control of contagious disease in animals, and all susceptible in-contact animals must be periodically reinoculated during the continuance of the outbreak. If, however, while the serum in the inoculated animal is still potent the animal can with safety be given actual experience of bacteria or virus, as the case may be, the passive immunity may be transferred into an active immunity. This is carried out in the serum simultaneous method against rinderpest. Highly susceptible cattle are given immune serum together with virulent rinderpest blood, and they develop an absolute and durable immunity. I propose now to describe briefly.

THE SERUM SIMULTANEOUS METHOD OF IMMUNISATION AGAINST RINDERPEST.

This method of immunisation is carried out by three inoculations, the first two of which are simultaneous. They are as follows:—

Inoculation A. 1. Inoculate with protective serum.
2. Inoculate with virulent blood.
Inoculation B. 3. Inoculate with virulent blood alone.

Inoculation B is carried out approximately a week after Inoculation A, but this will be referred to later.

Subjects for Inoculation.—This depends on the circumstances prevailing. If through an outbreak of the disease in the district there is urgent need to protect against rinderpest, practically all animals should be subjected, only the palpably weak or unfit animals being submitted to the serum alone inoculation, which must, of course, be repeated if the outbreak is prolonged.

If, however, there is no urgency and the inoculation is carried out at one's own convenience, the following animals should not be inoculated: (1) Calves under nine months, (2) Cows heavy in calf, (3) Cows in milk, (4) Sick or unfit animals. In India the dosage of protective serum varies in direct proportion to the susceptibility of the breed of animal. Naturally cattle from countries where the disease is not endemic are the most susceptible. The dose for English cattle is 50 c.c. per 100 lbs. body weight. The least susceptible country bred cattle are protected by 5 c.c. per 100 lbs. body weight, hill cattle and other slightly more susceptible breeds requiring doses of 10-30 c.c. per 100 lbs. body weight.

Anti-rinderpest serum for the whole of India is prepared at the Imperial Bacteriological Laboratory at Muktesar, where a large number of hyperimmunised buffaloes and hill bulls is maintained. Serum from hill bulls is always used for the serum simultaneous method, as it is rather more potent than that obtained from buffaloes.

* Presented to the Central Veterinary Society, January 3rd, 1925.

The Production of Virulent Blood.—I strongly recommend the production of the virulent blood on the farm where the inoculation is being carried out. This procedure avoids the possibility of introducing stray infections, and ensures the inoculation of really virulent blood. If blood is brought from a distance it may have lost its virulence before the inoculation is performed.

Animals which are to be used as virus producers must be carefully selected : if available young healthy calves of the most susceptible breed should be used. Too great importance cannot be attached to the selection of virus producers, and they should be kept under the closest possible observation for several days prior to their being infected with rinderpest. Temperature charts should be maintained, and any showing fluctuations in temperature should be discarded. Four virus producers are required each time the process of immunisation is carried out—two for Inoculation A, and two for Inoculation B, so it is advisable to have six in readiness to provide for eventualities. About a week before it is proposed to start inoculating the herd two virus producers are infected with rinderpest by being given subcutaneously a dose of 5 c.c. each of virulent blood.

The initial dose of virulent blood for very susceptible cattle is $\frac{1}{2}$ c.c., and for less susceptible cattle 1 c.c. At the second inoculation, i.e., Inoculation B, the dose is 5 c.c. for all cattle. It must be remembered that during the inoculation the herd is infective to unprotected cattle, and therefore the same precautions must be taken as if an outbreak of rinderpest had occurred naturally. The period during which strict isolation of freshly inoculated cattle must be enforced varies according to local circumstances. If carried out in a locality where there are unprotected highly susceptible cattle—as for example, on a military dairy farm in India—it is advisable that the inoculated herd should remain segregated for four weeks from the date of second inoculation.

If, however, the only unprotected cattle in the district are of low susceptibility the segregation restrictions may be relaxed fourteen days from the date of the second inoculation. Animals used, for military purposes may be put into working isolation as soon as the symptoms of the reaction disappear.

Technique of Inoculation.—As soon as the first sign of the reaction is shown by the virus producers, which is always a rise in temperature of two or more degrees accompanied by unmistakable signs of general systemic disturbances, blood smears are taken and examined microscopically. This examination is repeated for two or three days to ensure that the blood is free from piroplasms or other chance infection. At the height of the reaction, which usually occurs on the sixth day after infection, the virus producers are bled into a $2\frac{1}{2}$ per cent. solution of potassium citrate, or the blood is defibrinated. Each animal to be protected then receives subcutaneously the appropriate dose of protective serum on one side of its body and virulent blood on the other.

At the same time two fresh virus producers are injected with virulent blood alone. These animals then act as controls for Inoculation A, and as virus producers for Inoculation B.

During the next few days comparatively few symptoms are to be seen in the inoculated herd : any systemic disturbances that occur are treated as circumstances demand. Some of the inoculated cattle may be suffering from latent piroplasmosis which may be activated by the rinderpest reaction, and for this reason blood smears should be examined from any with a high temperature.

Piroplasmosis is usually successfully treated with a single intravenous injection of 3 per cent., i.e., saturated solution of trypan blue in normal saline solution at the rate of 20 c.c. per 100 lbs. body weight, with a maximum dose of 250 c.c. This solution should be filtered and injected at blood heat.

The second pair of virus producers must be carefully watched, and as soon as they exhibit symptoms blood smears should be taken and examined.

When they develop macroscopic lesions of rinderpest they are bled, as in the case of the first pair of virus producers. Each animal being immunised which has not shown active signs of the disease is then given a subcutaneous inoculation of 5 c.c. of virulent blood alone.

Provided that careful selection of virus producers has been made, and that the serum is of proved potency there is little likelihood of any unfortunate sequelæ. Isolated cases of piroplasmosis have been encountered, but as already stated, these are easily dealt with. If, however, unhealthy virus producers are used, disaster is invited, and several cases have occurred of whole herds being infected through the use of blood from virus producers suffering from piroplasmosis or other infections. In three years' experience of this inoculation I have had the good fortune not to lose a single animal among the cattle inoculated. The Imperial Bacteriological Laboratory at Muktesar records that in the course of over 5,000 inoculations carried out under its direction the total mortality was under ·8 per cent., and mainly from causes other than rinderpest, which, in ordinary circumstances, should have been avoided.

It, of course, goes without saying that the animal management should be faultless, and all precautions taken to avoid chance infection. During the process of immunisation resistance to other diseases is low, and should other infections be introduced serious consequences are certain to occur.

A case in point recurs to my mind, the process was being carried out by a native veterinary assistant, and shortly after the first inoculation hæmorrhagic septicæmia broke out, resulting in very considerable mortality.

The immunity conferred is durable, and I know of no case of animals which have been subjected to this method of protection having at a subsequent period become infected with rinderpest. The question of duration of immunity brings me back to the production of the virulent blood, and to emphasise again the

necessity of its local production so that its virulence may be above suspicion. If precautions in this direction are not taken the whole inoculation may be useless.

From a military standpoint it must be granted that the serum simultaneous method is the only practical means of combating rinderpest, and it is most strongly to be urged that no bovines should be sent on field service until they have been actively immunised.

In the past bullock transport on field service has been repeatedly immobilised through successive outbreaks of rinderpest: each batch of susceptible remounts causing recrudescence of the disease. By the serum simultaneous inoculation the greatest objection to bullock transport is removed.

We are justified in forming the opinion that the serum simultaneous method against rinderpest is an unqualified success, but unfortunately attempts to apply a similar form of immunisation against other diseases have, on the whole, ended in failure. We do not know definitely what reaction takes place in the inoculated cattle, but as the antigen used is bovine blood the inference is that the antigen is the rinderpest virus plus the effete products which that virus produces in the blood stream. This antigen on entrance into the blood stream of a susceptible animal provokes the production of antibodies and renders the inoculated animal immune.

I now propose to revert to the consideration of immune sera in general: we are most concerned with the prophylactic and curative properties of sera, and I think it is of interest to shortly review the present state of our knowledge with regard to a few diseases in which serum therapy is found to be serviceable.

1. Tetanus.

Anti-tetanic serum is produced by hyperimmunising horses. Its prophylactic value is very high, and may be considered as absolute provided it is administered before intoxication takes place. It is to be noted that toxin is produced which may be absorbed within twenty-four hours of infection. I do not think that this fact is sufficiently appreciated: it explains some of the so-called prophylactic failures of anti-tetanic serum. The duration of immunity is about fourteen days.

I disagree with the contention that anti-tetanic serum has no therapeutical value. Theoretically, of course, it can be proved that administration of serum after the appearance of tetanus symptoms is useless. I can only say that my experience has proved otherwise: my acute cases of tetanus, given the ordinary medical treatment, have usually succumbed, whereas an appreciable number of those treated with large and frequent doses of serum have recovered.

Recovery from a natural attack of the disease does not confer a lasting immunity.

2. Anthrax.

When susceptible animals are injected with increasing doses of attenuated cultures, followed by the inoculation of virulent cultures, they produce a serum which is protective against anthrax, but which has no bactericidal action against the causal bacillus. The passive immunity conferred by the inoculation of this hyperimmune serum lasts for fourteen days only, so that if the danger of infection is continuous, active immunisation is sometimes practised.

I can find no record of this having been carried out in England, but on the Continent, Sobeinheim records having carried out the simultaneous inoculation of horses with protective serum and anthrax cultures, and claimed that the results were highly satisfactory. The method is fraught with a considerable amount of danger, and is not likely to be very extensively practised. As a point of considerable interest it may be mentioned that Basredka in his recent paper on local immunity in infectious diseases, emphasises the fact that antibodies never occur in anthrax, and therefore that they cannot participate in the immunity.

3. Strangles.

A serum is produced by the hyperimmunisation of horses firstly with attenuated streptococci, followed by virulent streptococci. The use of this serum has been attended with the most favourable results, both as a prophylactic and therapeutic. An autogenous serum is always indicated when possible. The causal organism varies considerably in its virulence, and it is thought that more than one family of streptococci are involved in the causation of strangles. Attempts to actively immunise against the disease are not attended with success. Injection of virulent cultures leads to local abscess formation, and immunity is not conferred. Infection by ingestion and inhalation of temporary protected animals fails to prolong or develop the immunity. Recovery from the disease does not confer a lasting immunity. During convalescence the serum is immune, but this immunity is transitory, and it is not unknown for an animal to be attacked a second time with the disease. There appears to be very considerable differences of opinion as to whether strangles sera is bactericidal or not. Literature on the subject is not very helpful, except to emphasise the necessity of a specific serum.

4. Swine Fever.

Pigs which recover from swine fever produce an immune serum: these pigs may be hyperimmunised by repeated injections of virulent blood, and they then produce a serum which will protect susceptible pigs against infection. The duration of the immunity is about three weeks: Hutyra states that in Hungary it was proved that the immunity conferred was potent during the first six days of the period of incubation. This method has given very satisfactory results in the United Kingdom.

In the United States of America swine are actively immunised against swine fever on an extensive scale by the administration of immune serum simultaneously with virulent blood. This method is a parallel to the method employed against rinderpest, and has given the most successful results. The only objection to be raised to it are that the virulence of the virus of swine fever fluctuates very considerably, and also that

there is danger of the infection spreading from the premises where the inoculations are being carried out. For this reason this method is only practised when the inoculations can be carried out on an extensive scale. The immunity conferred is absolute and durable.

5. Hæmorrhagic Septicæmia.

The serum of animals which have recovered from the disease is protective: by hyperimmunisation with attenuated cultures a highly potent serum is produced, and this serum when used in conjunction with subcutaneous injections of attenuated cultures produces permanent immunity. The usual method of immunisation practised against hæmorrhagic septicæmia, however, is a polyfalent serum prepared by hyperimmunisation with mixed cultures of the Pasteurella group of organisms.

6. Swine Erysipelas.

Blood serum of animals which have been hyperimmunised by repeated inoculations with living cultures of the Erysipelas bacillus contains anti-bodies, which confer a short passive immunity to susceptible animals. This passive immunity may be converted to a permanent immunity by simultaneous or subsequent inoculation with virulent cultures of the bacilli. This latter method has been extensively practised, and has given most satisfactory results.

7. South African Horse Sickness.

Several methods of protection are practised, but they all comprise the inoculation of hyper-immune serum accompanied with or followed by injections of virulent blood. The immunity conferred is absolute for a comparatively short time, and the process of immunisation must be repeated annually. Recovery from the disease reduces the susceptibility of the animals, but does not entirely eliminate it. The virulence of the disease appears to vary considerably in neighbouring districts, and immune animals may become infected when transferred from the region in which they become immune to another district.

8. Distemper.

It must, I am afraid, be admitted that none of the protective sera now prepared are of any considerable value in the prevention or treatment of distemper. The sera of dogs recovered from the disease shows definite but limited prophylactic properties: all attempts to exalt the potency of immune sera have ended in failure. The virus of distemper appears to be of very low virulence, and to cause the greatest damage by lowering the animal's vitality, and thereby assisting the entry of secondary bacteria. If this is so it is comparatively easy to explain the limitations of distemper immune serum.

Before concluding this paper I desire to emphasise as strongly as possible the need for autogenous preparation of sera whenever possible. I feel that advance in serum therapy is hindered by the insidious accessibility of polyvalent sera. These sera are, no doubt, sometimes useful, but they must always be regarded as accessories to, and not as true serum therapy. Until an autogenous serum has been tried we are not in a position to estimate the possibilities of its use. We recognise the specific origin of disease, but we do not sufficiently recognise the specificity of sera.

There is one other point I wish to emphasise in conclusion. It is that more favourable results will be obtained from the use of a homologous serum than from a heterologous one. Immunising serum, introduced into a susceptible animal, is attacked on every side, and its very antibodies induce the production of other antibodies, whose function in life is to facilitate their expulsion.

References:—

1. Hutyra and Marek. *Diseases of Domestic Animals.*
2. W. A. Pool, M.R.C.V.S., Officiating Director, Imperial Research Laboratory, Muktesar. *Serum Simultaneous Inoculation against Rinderpest.*
3. Besson. *Practical Bacteriology and Serum Therapy.*

Discussion.

The discussion was opened by Capt. H. Kirk, who said: Twenty-four hours before the last June meeting, Capt. Slocock's paper was thrust into my hand, with the request that I should open the discussion. It will be appreciated, therefore, how brief a time was at my disposal for giving it adequate consideration. But I had prepared a somewhat sketchy reply in time for the meeting, which, as you know, was postponed *sine die*, and I must now apologise for the fact that I have entirely overlooked its revision in the interim. I rather regretted to find that seven pages were devoted to immunising against rinderpest, especially as the author *agrees* that this is of little interest to practitioners in England. In perusing those seven pages, however, I find that the dose of immune serum recommended for English cattle in India is 50 c.c. per 100 lb. of body weight. This is an immense dose, and must have been an exceedingly costly affair to the Indian Government. But I realise that a sufficient dose of anti-serum must always be administered to obtain a good effect; and this does not depend so much upon its volume, as upon the amount of antidotal substance it contains. The neutralisation of toxin by anti-toxin is strictly quantitative; that is, a given quantity of toxin requires an equivalent amount of anti-toxin to neutralise it. Moreover, as toxin seems to combine with the tissues, and since the longer the toxin acts the more stable this combination appears to become, a relatively larger amount of anti-toxin should be administered if the disease has lasted some time than if it has only just shown itself. Probably a *massive* dose of the antibody is able to *displace* the toxin from its combination with the tissues in the early stages.

As Capt. Slocock rightly says, our knowledge of serum therapy is really small: in fact, the matter is only yet in its infancy. Sufficient, however, has been discovered about the properties of serum to enable

clinicians to obtain some remarkably good results in certain diseases—as, for instance, in rinderpest and tetanus, mentioned by the essayist; and in the human being—in diphtheria, streptococcus infection, pneumonia, dysentery, plague, and even snake bite. So far as snake bite is concerned, the use of anti-venenes is limited, for it has been shown that if a cobra with full glands bites a man, many times the minimum lethal does is probably injected. Grave symptoms thus come on so rapidly that, usually, no opportunity is offered for remedial treatment by anti-sera. Moreoever, as a definite specificity exists between the poison of a particular snake and its anti-venen, unless the appropriate serum is available, little effect will be produced. Otherwise, if the serum is immediately available, and is appropriate to the particular venom, great benefit accrues from its use. Capt. Slocock opens his paper by enumerating the properties of sera, but I notice that he has omitted at least two such properties. One is the hæmolytic action which has for long been recognised as a possible result of introducing strange serum into an animal. It is only of course, in a few cases, and in slight degree, that the serum of one animal has the power to dissolve the red corpuscles of another animal belonging to a different species, and it is important to bear in mind. As an example, guinea-pig's serum is hæmolytic to ox corpuscles. Snake poison will also produce hæmolysis. The other property omitted was the opsonic action of immune sera. This action, briefly explained, is the presence in the serum of a substance (opsonin), which renders organisms sensitive to phagocytosis. Denys and Leclef showed in 1895 that in the case of an anti-streptococcal serum, the latter produced its effect by acting upon the *organism* and not upon the leucocytes. Wright and Douglas, in their first paper, showed that phagocytosis of staphylococci by leucocytes depended on a body in the normal serum which became fixed to the cocci, and made them a prey to the phagocytes. The opsonic action of the serum against an organism is increased by the process of immunisation, and the degree of immunity has become to be known as the opsonic index. In the list of serum properties which Capt. Slocock gave, he mentioned "Sensitising properties." By this I presume he referred to anaphylaxis (i.e., the opposite of prophylaxis), or the supersensitiveness of the body to certain substances. It is well known that the ingestion of shell fish, certain fruits, and other articles, is followed, in quite normal individuals sometimes, by constitutional disturbances. The individual exhibits a super sensitiveness to these substances. A similar phenomenon may occur in the process of serum treatment, for it is occasionally found that repeated injections of certain substances in non-toxic doses may be followed by markedly toxic or even fatal symptoms. The substances which have been found to possess this property are always proteins, such as may exist in bacteria and their toxins, animal poisons, and the various foreign proteins, such as those of milk, serum, egg-albumen, etc. As examples, tubercular patients appear to possess a special susceptibility to the action of tuberculin; and occasionally serious results have followed the injection of minute doses of diphtheria or tetanus toxins, repeated after a suitable interval. It has been found that after the repeated injections of horse serum into rabbits, a stage was reached at which an additional subcutaneous injection produced marked œdema and even necrosis, while an intravenous injection—harmless to an *untreated* animal, brought about a fatal result.

There is still another peculiarity about sera which it is imperative to bring to your notice. A serum which is bactericidal cannot produce the destructive effect *alone*, but requires the addition of a substance normally present in serum, and known as Complement. Complement is relatively unstable, and is not increased in amount during the process of immunisation. It also diminishes in amount when serum is *kept*, so that unsatisfactory results with this class of sera may be due to a deficiency of complement. The all important action of the "immune body" is thus to bring an increased amount of complement into union with bacteria.

Now, this is extremely important in reviewing the efficacy of serum therapy, and it behoves one to endeavour always to obtain fresh serum where possible. So much, then, for the peculiar properties of sera.

Throughout his paper Capt. Slocock has given examples of the benefit to be derived from the employment of the "simultaneous" method of producing immunity, which, as you have all heard, is merely the introduction of serum simultaneously with virulent matter. Obviously the injection of living cultures of pathogenic organisms, or virulent blood, would lead to disastrous results unless an immediate and passive immunity were created by the previous or simultaneous introduction of hyper-immune serum. In canine distemper a very similar method to the "simultaneous" is frequently employed, although in this case the virulent material is replaced by a bacterin. Bacterins in distemper may be used for therapeutic purposes, but it would often be considerably dangerous to add further toxin to an already contaminated system, unless at the same time some neutralising agent was also added. As a *prophylactic* measure the simultaneous injection of serum with anti-distemper bacterin is superfluous (unless there is a latent infection) because the bacterin contains only killed organisms, and little is to be feared from properly graduated doses.

In speaking of rinderpest, the essayist very rightly emphasises the importance of producing the virulent blood on the farm where the inoculations are to be carried out, as it avoids the possibility of introducing chance infections; and it ensures that the particular strain of organism against which one is working, is involved in the proceedings. But this would not be desirable in distemper immunisation, because we do know that in this disease a dog may develop considerable immunity to a particular strain of the virus common to its own district, but will often fall

a prey to some other and perhaps more virulent strain of another district. The same is true of South African horse sickness.

Capt. Slocock mentions on page 7 that during the process of immunisation, resistance to other diseases is low, and should other infections be introduced, serious consequences are certain to occur. This is a point which I must lay stress upon in the vaccination of puppies against distemper. Such puppies after the injections should be isolated for a full fortnight to allow of immunity becoming firmly established, for no doubt unfortunate sequels have often attended the exposure of dogs to infections of all kinds (*including* distemper) too soon after inoculation.

Now, as regards anti-tetanic serum, I am in hearty agreement with all the essayist has said, for my own clinical experiences have been precisely his. In some six cases of tetanus which I can remember, in which the serum had been injected daily, all recovered save two. One of these was a highly nervous colt, which in normal circumstances could not have been handled, and the other an old decrepit horse which was well insured, and which I can only suspect was worth more to the owner dead than alive Hence its death. The anti-toxin must be very early administered, and in large doses. But I regard with great importance the incarceration of the patient in a quiet and darkened stable, the key of which must be in my pocket, and the addition of belladonna to the nutrient liquid food. I may, perhaps, have been more fortunate in my cases than some other practitioners, but I place great reliance upon anti-tetanin.

Just as no physician or drug can cure disease, so it is impossible for a serum to do so. The physician and the drug he employs only *assist* the curative action of the tissues, and tissue damage is repaired by cellular action alone. Anti-toxin has no more power than any other drug to repair tissue damage if this has already occurred. The anti-toxins and anti-sera are able to neutralise the toxins or activities of the bacteria which produce disease, and if they be administered early enough, they will prevent the tissue damage to which the morbid symptoms are due. Early treatment is, therefore, of paramount importance. Capt. Slocock opposes the view that anti-tetanin has no therapeutical value, and so do I, for this reason: that although an anti-serum cannot repair damage already done, it can enter into chemical combination with toxins to prevent any *further* damage, and thus the patient is given a fighting chance. Intravenous administration should always be adopted if a rapid action is desired. But where this is difficult, intramuscular injection is the next best method.

In alluding to strangles, Capt. Slocock suggests that an autogenous serum is always indicated, as the causal organism varies considerably in its virulence. It *may be* desirable, but I fail to see how it can be carried out. There can obviously be no question of *preventing* strangles in an animal with an autogenous serum, as the animal must first be diseased before one can obtain its germs with which to make such a serum. For *therapeutic* purposes, an autogenous serum is precluded on account of the great loss of time involved in its production. A healthy animal must first be hyper-immunised with the organisms from the animal one proposes to treat, before a serum can be obtained. By that time, the patient is either recovered or dead. If I am wrong in my conclusions, I trust Capt. Slocock will put me right. Now, as to swine fever: About nine years ago I was a Local Veterinary Inspector for the Board of Agriculture, working in five of the Western Counties, and dealing solely with this disease, and I remember the first issue of what I presume was an immune serum. After destruction of the diseased swine on a farm, we inoculated all in-contacts with this serum instead of killing them, as hitherto. Two or three months later, two preparations were sent for use—marked A and B, and with full directions. But I regret the Board never took us so far into its confidence as to explain what we were using. At least, I cannot remember that they did, and although my recollection of the work is necessarily hazy, I *do* remember that in subsequent visits to these farms, I never had to slaughter any of those pigs I had inoculated, except upon one occasion. I hope Capt. Slocock will be good enough to tell me what method is now being employed, as the result obtained then seemed to show great promise.

Finally, Capt. Slocock's paper deals with distemper, and asserts that although the sera of dogs recovered from the disease show definite though limited prophylactic properties, none of the sera now in use appear to have any value. I am not in entire agreement with this statement, as I have known decided benefit to follow the use of Ferry's serum. But I feel rather strongly that the reason for failures is more than likely to be found in the fact that what is universally used is a horse serum, the production of which depends upon the hyper-immunisation of a horse with an organism which *may not* be the cause of distemper, and therefore not specific. I believe that if those who hold licences for conducting experiments would try the effect of inoculating *dogs'* immune serum, instead of horses', we would then be able to test the value of these "definite prophylactic properties" of which Capt. Slocock speaks. We know that in nearly every fatal case of distemper, it is the complication, and not the primary infection which directly brings about death, and that the causal organisms of these complications are frequently cocci. Now, since Ferry's mixed bacterin contains *B. bronchisepticus*, staphylococci, and streptococci, if follows that if an animal is immunised with this bacterin, the immune serum obtained from that animal's blood should possess antibodies which should not only neutralise the toxins of *B. bronchisepticus*, but also those of the cocci named.

Capt. KIRK then read the following message sent by the *Daily Express* New York correspondent to his paper on December 28th:—

"Great interest has been aroused in the medical world here by a despatch to the *New York World*, which says that Dr. R. S. Green, assistant professor of bacteriology

at the University of Minnesota, has discovered 'ultra' microbes living as parasites on disease bacteria.

"The professor claims that when made into a serum they have killed the most highly developed cultures of pneumonia, typhoid, diptheria, dysentery, anthrax, and cholera. The only culture yet used in the experiments which the serum has not killed is that of tuberculosis.

"Dr. Green has so far experimented only with chickens, but he says that the results show an astonishing success of the 'ultra' microbe serum in producing an epidemic of death among bacteria, just as bacteria produce epidemics among living things. Dr. Green adds:—

"The small bacteria are about one-twenty-five-thousandth of an inch in diameter, and the 'ultra' microbes who live as parasites on these tiny life units are so small that they cannot be seen with the most powerful microscope, but our experiments prove that they exist.

"If our experiments with chickens can be applied to human beings—and there appears to be no scientific reason why this cannot be done—the ravages of epidemic diseases can be checked at the start.

"We have only made a beginning in the experiments, but the picture of bacteria preying on man and the 'ultra' microbe preying on bacteria is no longer a theory."

Capt. Kirk concluded: I wish to tender my thanks to Capt. Slocock for providing us with so useful and interesting a paper, and I again apologise for any shortcomings in my own contribution.

Mr. L. P. PUGH: I was very interested in the observation of Capt. Slocock that serum immunity has been rather disappointing in many cases, because when I first left college I was full of sera and anti-sera treatment and, meeting with many failures, I read up to see where the trouble lay. I than found I could understand how an anti-serum could be produced with organisms producing a powerful anti-toxin, because you could take a bottle and say: "There is a toxin; if I inject that into another animal, that will produce an anti-toxin"—that made evident the reasonableness of using, for instance, anti-tetanic serum. But when you come to organisms such as Bang's bacillus and streptococci, the anti-sera seems to be almost a complete failure. There are many strains of tetanus bacilli which can be shown to be different from one another, yet the exo-toxin is common to all of them, and so an anti-serum will protect against all strains of *B. tetani*. But there is no common exo-toxin for the various strains of streptococci. That supports what Capt. Slocock says, that polyvalent sera, in his experience, have been of little use. With regard to the treatment of distemper with various organisms, I never had any success with any of these anti-streptococci (and anti-staphylococci) preparations, and I think that same explanation holds good.

I should like to add my thanks to Capt. Slocock for his extremely interesting paper.

Mr. L. S. BALLS: I should like to ask, with reference to the curative treatment of tetanus, what percentage of cures Capt. Slocock has had without injection of anti-tetanic serum. I believe the administration of big doses to be good treatment, and that the result depends a good deal upon the temperament of the animal. If you have a placid animal I think, with the usual measures, he will do just as well without the serum as with it.

Professor WOODRUFF: I should like to make a few remarks on this paper, but before doing so I desire to refer to the fact that before I left this country in 1913 this Society paid me—I am not sure whether or no it was a unique compliment—but at any rate a very gratifying compliment in making me an Honorary Fellow. It is, indeed, a great pleasure to me to be here at this meeting, and to take some little part in the proceedings. (Hear, hear.)

One of the things one must gather from Capt. Slocock's paper is that he is an optimist. I suppose we are all likely to start as optimists when we begin serum therapy. It has been proved over and over again that it is no use making a general sweeping statement about any kind of immunity in its application to disease. Nearly every one of these sweeping assertions has been proved false in many cases to which it has been applied. I think those who have specialised in particular diseases will agree with me that in many cases serum therapy has failed in regard to specific diseases. Everybody held, when tetanus and diphtheria anti-toxins were discovered, that here was the royal road to the treatment of all diseases due to bacteria. But it was shortly found that they only applied to those in which there was a high grade of toxin, and that it was the anti-toxic property of the serum that cured. Capt. Slocock has in nearly every instance talked about a serum treatment along with an active immunity with the active agent of the disease. I think he will find that nearly all his immunity is due to the agent, and that the serum, while useful to attenuate the full force of the disease, is a minor factor so far as immunity is concerned.

Moreover, it takes a long time to produce a specific serum. You have got to get the real thing (the specific type), and when you have got it it will take you from six to ten weeks before you are going to get your hyper-immune animal from which to obtain your supplies of serum; and many of us have proved, after that, that we have not been dealing with the specific type, and we have had to go back on our tracks. Then, while we were producing the specific type, the outbreak has come to an end. There is a danger, too, because when you are dealing with a highly-contagious disease you can only apply it in a country where the disease is endemic and widespread. There is, therefore, a great deal to be said in explanation of the failures of serum. The longer experience you have of it, the less faith you have in it as an *omnibus* method of treating disease.

Capt. Slocock said something about anti-anthrax serum. How are you going to apply that in England? Moreover, where anthrax is endemic and you have thousands of sheep to protect against the disease, there the use of serum is impossible because of the amount required, the cost of its production, and the fact that you have an easy method in the active

immunity conferred by the Pasteurian system of the use of spore vaccines.

With regard to tetanus, I do not quite agree with Capt. Slocock that anti-tetanic serum is a good therapeutic agent—we all know that it is a magnificent prophylactic agent. In Capt. Kirk's figures two out of six animals died—he had a mortality of more than 33⅓ per cent. I do not think you could have a greater mortality if the animals were left untreated by serum. Once tetanus toxin has become incorporated with the cells of the nervous system I do not think serum is going to affect the requisite separation.

Concerning this other *omnibus* therapeutic agent from the States, I imagine that the newspaper correspondent is alluding to a bacteriophage. That is not an American invention—it is like many other "inventions" that come from the States; it has been discovered before. The Americans got hold of it, and I think the credit is due to Dr. Twort, who, with one of our own colleagues, the late Mr. Ingram, was responsible for much of our knowledge with regard to Johnë's disease. The investigations of Twort lay fallow for some years, and then Darrell took up this question of bacteriophages. That work created a tremendous stir amongst bacteriologists: it was found very useful in coliform infections, and it was hoped that we had found something that was going to prey upon bacteria. Experiment has shown, unfortunately, that the high hopes centred upon the bacteriophage have not borne fruit, and that, generally speaking, it is a very interesting phenomenon, but its practical application is not of very much value. I enjoyed listening to Capt. Slocock's paper, but I think that when he tries these things out, he will find that he gets many disappointments. I think a note of caution is necessary with regard to serum therapy, as a widespread means of treatment in active disease.

Major F. T. G. HOBDAY: I am only a clinician, but from my experience I must agree with what Professor Woodruff has said. I can speak from extensive practical experience of strangles and distemper. Nobody worked at one time with more enthusiasm at the serum therapy in those diseases than I did. It is disappointing to have to say that at the present moment we have no specific serum against distemper. We have many self-styled specifics from all countries; but most of us who have used them are very disappointed with the result. If those serums that are advertised as cures were really cures, the general public would not have given their thousands of pounds to promote the present Distemper Research with a view to the discovery of an effective serum against it.

With regard to tetanus, my experience is that if you use the serum as a preventive it is excellent, but that if you use it then the disease has laid well hold of its victim, the old remedies are the only measures upon which reliance can be placed. I should like to add a word of congratulation to Capt. Slocock; his paper has been fascinating. But, except for its application to a comparatively few diseases, serum therapy is very much in its infancy at the present time. *We practitioners want results*, and although you have results in rinderpest and one or two other things, there is a great deal of room for work yet; and we are crying out for similar results in other diseases.

Colonel REID: I am here as the guest of Major Hobday, and it is the first time I have had the honour of attending any of your meetings. I labour under the disability of not having heard Capt. Slocock read his paper, but I have been very much interested in the discussion. In a general manner I may say that I support Professor Woodruff's contention that one must be extremely guarded in estimating the potential values of serum. I think that we should not lose sight of the attempt to commercialise these products.

I should like to allude to the practice of using colloidal drugs. I feel that in the development of colloidal chemistry there lies before us a great field of work—you are all aware of the utilisation of these products in protozoal diseases.

Concerning polyvalent vaccines and sera, I do not consider these products to be in accord with scientific principles, and consequently their use in practice I regard as unsound. As our knowledge of the ultra-visible viruses increases we may learn the importance or otherwise, in the course of certain diseases, of the presence of organisms playing a secondary rôle. In the meantime we should preserve an open mind on the subject, and particularly refrain from drawing hasty conclusions based upon the results attending the use of vaccines in cases insufficient in number to allow of definite deductions. I should like to add my appreciation of the very able manner in which Capt. Kirke has opened the discussion.

Major HOBDAY: I wish to say one more word, because it relates to something quite new, and something which will be very pleasing to the profession. It has only just been published. It is that another has been added to the list of diseases of which the causal organism has been found—jaundice in the dog. Messrs. Dalling and Pugh, working in a laboratory with Dr. Okell, have proved that "yellows" in the dog is due to a leptospira which has been obtained from the rat.

Major Hobday, proceeding to read the following extracts from the article "Leptospiral Jaundice in Dogs (Yellows)," by Dr. C. C. Okell and Messrs. T. Dalling and L. P. Pugh, appearing in the current issue of the *Veterinary Journal*, continued:—

In regard to passive immunity the authors say: "We have clearly shown that guinea pigs can be protected against certainly lethal doses of leptospirae of canine origin by an immune serum, and our field tests go to prove that a similar protection can be obtained in dogs exposed to natural infection. Of twelve dogs which were "contacts" in an enzotic, seven were inoculated with 5 c.c. anti-leptospira serum, and five were left uninoculated. Two of the five uninoculated dogs developed the disease, while the seven uninoculated dogs remained healthy. We believe that anti-leptospira serum will play an

important part in prophylaxis. . . We have received records of ten instances in which serum was administered to dogs suffering from the disease. In every case jaundice was obvious at the time of the administration of the serum. Nine of these, in the opinion of the veterinary surgeons, were saved by the administration of the serum. We, at present, have an open mind on the question. We have tried to save dogs which we had artificially infected, but we have hitherto been unsuccessful in saving them after jaundice had developed."

As Mr. Pugh is with us, perhaps he will add a word on the subject.

Mr. L. P. PUGH: It has been proved by a long series of laboratory experiments that "yellows" is identical with Weil's disease as occurring in human beings. We had a large number of outbreaks and we were fortunate enough to observe spirochætes moving across the microscopic field. That put us on to the track of this being something analogous to Weil's disease. We tried protecting our affected dogs with an anti-serum prepared from Weil's disease, and we had quite good results. I have had thirteen cases during the last twelve weeks, and eleven have recovered, and we have demonstrated that the serum from the recovered animals has protective qualities to guinea pigs inoculated in large doses. But we have been very cautious in regard to making any claim to curative properties, though it certainly has protective powers.

Major G. W. DUNKIN: This has been a most enjoyable evening for us all, and I may say that I am so extremely interested in this subject that I feel I could never weary of its discussion. I should like to ask Captain Slocock one or two questions. Can he tell us how long he has been successful in keeping the virus *in* vitro; what tests he applies for its virulence; if there is any diminution in its virulence by keeping; and if so, whether he has been able to use advantageously the virus, the virulence of which has been thus attenuated.

I have an open mind in regard to the curative properties of anti-tetanic serum, and my open mind is due to an experience I had on a visit to a certain laboratory. A horse was supposed to have had an over-dose of tetanin toxin, and when I saw him he certainly had all the symptoms of a badly affected case of naturally acquired infection. He was injected with 2½ litres of serum intravenously; in two hours he was up and feeding. It is, to my mind, a question of amount.

Major Dunkin gave other instances of a similar character, and proceeded: I think, therefore, that there are curative properties in anti-tetanic serum, provided you give enough. The difficulty, of course, is that whereas my friend in his laboratory knew the dose of toxin he had to combat, practitioners in the field have no such guide as to the amount of serum requisite to overcome the infection.

Reference has been made to swine fever. Some nine or ten years ago I was engaged, in a similar manner to Capt. Kirk, as a local veterinary inspector under the Ministry of Agriculture, and, like him, I had issued to me a series of bottles of serum. I was not told how the serum was prepared, and the main feature of the treatment was that, in addition to treating one's apparently healthy pigs with the serum, these animals had to be subsequently mixed with the ailing pigs. This last item in the treatment has not been mentioned this evening, but I believe the idea of the Ministry in those days was to confer an active and lasting immunity thereby.

A good deal has been said about distemper. I am not going to say much about it, except that I agree with the majority of speakers that the vaccines and sera at present on the market are useless, at any rate, as regards cure. It is, as Colonel Reid says, absurd to inject one's patients with a lot of material which is not known to be the cause of the disease one is trying to prevent.

CAPT. SLOCOCK'S REPLY.

Capt. SLOCOCK: Professor Woodruff has described me as an optimist: I do not think I am one in reality, because I started off with the opinion that from a clinical point of view serum thereapy is most disappointing, but I certainly am hopeful that we may do more in serum therapy than has been done up to the present. Capt. Kirk makes reference to my suggestion in alluding to strangles, that an autogenous serum is always indicated, as the causal organism varies considerably in its virulence. He says he fails to see how it can be carried out. But I specifically said "when possible." When you have got a strangles outbreak on a large scale, or the possibility of one, I think the wise thing to do is to get an autogenous serum as soon as possible. Mr. Pugh has supported me in that. I guarded myself about distemper. Capt. Kirk says he has had successful results with distemper immune serum. I said it had not been of any considerable value in prevention or treatment. Colonel Reid bears out the reason for that by saying that we do not know much about the cause of distemper yet—perhaps we shall do in the course of a year or so. In regard to distemper, Capt. Kirk referred to inoculation with bacterins, but you are only inoculating against secondary invaders. Mr. Balls asked what percentage of cures I have had with the injection of anti-tetanic serum. I regret I have not kept records of recoveries in tetanus cases. In acute cases I have done as Major Dunkin has said, and given ten times the maker's dose, and I give it often—and I have had much success. I shall continue to give large doses so long as I can get someone to pay for the serum. (Laughter.) Professor Woodruff emphasises the danger of generalisation; I see that as much as he does. As Major Hobday rightly remarks, serum therapy is yet in its infancy. Major Dunkin asks *re* the life of the virus in *vitro*. Experiments on that subject were carried out by the late Mr. Shilston, at Muktesar, in Northern India, and it was found that forty-eight hours' exposure to atmospheric conditions destroyed the virulence. The virulence of rinderpest virus is so variable that no practical use can be made of the attenuation of virulent blood by storage.

I think the other questions raised have been answered by others during the course of the discussion.

The Physiology of Lamenesss.

By W. C. Miller, M.R.C.V.S., Royal (Dick) Veterinary College, Edinburgh.

(*Continued from page* 63).

Symptoms.—II.—ABNORMALITIES IN THE METHOD OF POSING THE FEET.

Normally, the foot should come to the ground flat. In horses which work at the walk, however, when harnessed to a heavy load, the toe and the external quarter come down first. Horses used at a fast pace often put their heels down first normally, but not during ordinary speeds. When descending a steep slope the heels may touch the ground first, and when ascending the toes usually reach the ground before the rest of the foot.

When a lame horse places its foot upon the ground so that the heels come down first, it usually indicates that there is a painful lesion in the region of the toe or in the fore part of the foot (*e.g.*, laminitis localised to the toe, sand crack, keratoma, binding of the toe-clip or of a nail at the toe, etc.). In such cases, when they only affect one foot, after having come into contact with the ground at the heels the foot may execute a slow movement of recoil, as if the horse were attempting to retard the participation of the toe in the supporting of the weight. In some cases this recoil takes the form of a slight tilting of the toe, and in others the whole foot is dragged backwards an inch or so from its original stance. If the horse so affected is made to walk over soft easily indented ground, this abnormality will become more obvious, either by producing a lessened impression of the anterior part of the foot, or by showing a slight scraping of the ground in advance of the true imprint of the foot.

In cases where adduction is present, the contact of the heels with the ground before the toe indicates a certain amount of discord between the antagonistic extensors and the flexors, with a preponderance of power in the extensors. This is unusual, because there is no doubt of the greater strength of the flexor muscles in the normal horse.

In affections in which the weight of the horse falls behind the heels, there may be a perfectly normal posing of the foot, but when the weight settles on to the feet there is often a tilting of the toe, and the foot only touches the ground at the heels as long as the weight is being supported (*e.g.*, in rupture of the suspensory ligament or of the flexor tendons, or in disinsertions of the inferior sesamoidean ligaments).

Posing the foot on the toes indicates either lameness of the posterior parts of the foot (*e.g.*, localised laminitis at the quarters, quittors, painful sidebones, navicular disease, etc.), or a predominance of action of flexor over extensor muscles through some incoordination between them, or through such conditions as contractions and shortening of the tendons of the flexors.

In cases where only one side of a foot is attacked by a painful lesion, the weight is taken and borne by the opposite side for preference, *i.e.*, either the external or the internal quarter will come to the ground first and will imprint the ground more deeply.

III.—ABNORMALITIES IN THE INTENSITY OF THE NOISE MADE BY POSING THE FEET.

Normally each foot makes a sound ("clatter") equal in intensity to that of each of the other three, although it is sometimes possible to distinguish a slightly louder noise when the fore feet come to the ground than when the hind feet strike the ground. Whenever lameness is painful to any extent the noise made by the lame leg is less loud than of the others, because the posing of the foot is made more slowly and carefully. In lamenesses which depend upon some condition in which there is an interference with the function of the tendon of the anterior tibial muscle, such as rupture of this tendon, or when there is paralysis of the muscle, or when the superficial peroneal nerve is injured, or when the extensor of the digit is paralysed, the foot is badly suspended, falls to the ground in a passive manner (through its own inertia), and more noise is made than in the sound feet. The analogy also holds good in the case of fore limbs. The clatter of the affected foot is also more noticeable in stringhalt than in the normal limb, for in this case the foot is lifted to a higher level than the healthy one and falls from a greater height and at a faster rate. Young horses affected with shivering often make more noise with the foot or feet than usually, but the increase in the noise is irregular in appearance. In such cases as this abnormality is seen the reason is probably that there is some incoordination of the muscles, having its origin in whatever nervous lesion in the cord is responsible for shivering.

IV.—ABNORMALITIES IN THE LENGTH OF THE STRIDE.

In an absolutely correct gait the length of each of the steps is equal. Those of a lame limb may be either normal, shortened or lengthened.

The pace is shortened in the majority of painful lamenesses attacking the two fore or the two hind feet or legs (*e.g.*, laminitis, sidebones, low ringbones or high ringbones, bilateral spavins, etc.), because the animal, to ease each of the affected limbs in turn from supporting the weight, brings the other member up sooner and faster. For this same reason the feet are not lifted to any height, and the pace becomes short and low. In very severe cases there is a great disinclination for the horse to lift his feet at all, and the uninitiated often consider that the horse has hurt his back. In bilateral navicular disease the shortness and lowness of the paces taken with the fore feet are so well marked as to be almost characteristic of this condition. Sometimes a short rapid low pace is associated with some functional defect having its seat in the shoulder (*e.g.*, slipped shoulder).

The pace may be shortened in certain unilateral lamenesses when it is often thought to be due to some defect of the action of muscles situated high up in the

limb, but, since the swing of the leg over the ground is not only due to the action of proximal muscles in the limb, but to such structures as ligaments and tendons lower in the limb, one is hardly justified in stating that shortening of the pace invariably points to lameness high up. On the other hand, however, *lengthening* of the pace, with one or two exceptions (such as fracture of the neck of the femur, which is usually obvious without detailed analysis of the gait), almost always indicates that the lameness is situated in the lower part of the limb, generally the foot.

In the hind legs the pace is usually shortened in painful conditions involving the posterior thoracic or the lumbar vertebræ or the muscles below them, as well as in myositis of the gluteals (azoturia), and in fractures of the pelvis without displacement. It appears that a shortening of the pace, in such cases, is a defensive reaction on the part of the animal, having for its effect the lessening of the efforts of impulsion and the pain which they cause, during the gait. The muscles around the painful areas are thrown into a state of permanent rigidity (almost tetany), so that movement in the region is very limited, and the fixity of the bones of the part prevents undue lateral displacement of the weight, which might be attended by serious consequences (*e.g.*, the conversion of a partial into a complete fracture, etc.). The horse assumes a stiff tedious gait and during progression the muscles of the loins and quarters are thrown into a rigid contraction.

V.—ABNORMALITIES IN THE ATTITUDE OF THE HORSE, AND IN THE POSTURES OF ITS LIMBS.

Abnormal attitudes are the expression of alterations in the structures of the limbs, or of pain in some part, and in several cases they furnish us with almost pathogenic features. The horse which brings its hind legs forward under the body and thus relieves the fore limbs from a portion of the weight which they normally ought to support, practically tells us that he is suffering from some painful condition in these same fore limbs, as is seen in laminitis, sesamoiditis, etc. If the fore limbs are placed far back under the body it is obvious that he desires to relieve the hind limbs from a share of their weight, and the indications are that these hind feet or limbs are the seat of some very painful condition, such as laminitis in the hind feet, threatened paraplegia, etc.

Arching of the back is often accompanied by a very pronounced over-shot fetlock in front, and this latter may be the result of disease of the cannon or phalangeal bones, of one or other of the joints, of foot troubles, or of chronic or acute alterations in the back tendons, or it may perhaps arise in conditions where two or more of these conditions are associated. It may be of recent date, when it will usually disappear on lifting the opposite foot, or it may be old standing, when it will resist such a test. The condition of over-shot knees, and over-shot fetlocks has a rather peculiar and somewhat special pathogenicity, and its appearance should usually cause one to look for some other signs of trouble in the feet or lower limbs, either in the bones or in the tendons passing the flexures of these joints.

Twisted legs, over-shot knees and fetlocks, buck or calf knees, knock knees, cow hocks, curved hocks, straight hocks, etc., etc., may be of a hereditary or congenital nature, or may follow some one or other variety of lameness, and cause an abnormal posture and usually an abnormal gait. One would also like to remind you that the irregularity may be produced, not only in the lame limb (when due to lameness), but also in the limb which relieves the suffering limb from weight bearing.

Along with attitudes, mention must also be made of certain abnormal postures which the limbs assume under certain circumstances. In this connection, the affected animal assumes some position for his limbs that will procure for him some ease of the pain. For example the horse " points " (*i.e.*, he carries the fore limb forward in a straight line in front of its normal stance) in certain lamenesses. This position is taken up so that the lame limb may be relieved from bearing weight, and so that the sensitive structures may be relaxed. The posture is characteristic of conditions in which the integrity of the deep flexor tendon, or the structures upon which it presses, is compromised. The position of the limb allows the deep flexor to be slackened, and pain at the point of its insertion into the third phalanx (*e.g.*, ostitis of the semi-lunar crest), or at its point of contact with the sesamoid of the third phalanx (navicular disease), or pain due to sprains or distensions of its own tissue, is relieved.

When the pain is greater than in the above case, the limb is sharply carried forward and then brought back again very cautiously, sometimes without quitting the ground, and then the limb is lifted and brusquely carried forward once more. It is as if the animal experienced shooting pains when the limb rests in its normal position. It may occur in severe wounds of the sensitive parts of the foot, in acute inflammation of the coffin joint, due to penetrating injuries, and in under-run soles.

In either of the above postures the horse is unable to bear any weight upon the limb, and it is compelled to place it upon the ground and rest the opposite over-worked foot at intervals.

In an extremely painful foot case the lame limb may be held intermittently off the ground altogether. This is seen very frequently in the hind foot affected with sand crack, keratoma, inflammation of the stifle joint (gonitis), and synovial infections in the hock or fetlock, etc. The lifting of the limb may be carried out slowly or sharply, but the posing of the foot upon the ground is always undertaken with great precaution and deliberation.

In a few specially severe conditions the lame limb may be held off the ground altogether (" nursed "), or it may just rest with the anterior face of the hoof, or the point of the toe, lightly touching the ground. In fractures of the pastern, or of the third phalanx, the foot is usually held suspended an inch or two above

the ground, and if the horse is made to move he does so by hopping upon the sound limb, with what assistance can be gained from the other pair of limbs. In acute arthritis and periarthritis of the stifle joint, and in severe penetrating wounds of the hock, the stifle and hock are kept flexed, but the toe is allowed to rest on the ground. In the fore limbs the joints of the whole member may be found flexed, and the foot may be carried out a little way in advance of its neighbour, or it may rest upon the tip of the toe alongside its fellow, in tendo-synovitis of the bicipital groove of the humerus, in paralysis of the brachial plexus or of the radial nerve, or in serious affections of joints, tendons, or tendon sheaths. In each case, the object of the animal is to relieve himself of pain.

When the two transverse legs are affected, the horse alternately rests his weight upon one of them and carries the other forward beyond its usual position. It is such horses as are affected with one or other of the above serious conditions that will hardly ever lie down, because of the excruciating pain experienced when rising from the ground. Some, however, whether from excessive fatigue, or from inexperience, will lie down and when once down may fear to make any attempt to rise. If such are regularly assisted to rise, either by slings or other means, they occasionally make a recovery, when those that remain standing, or those that remain lying, succumb from sheer exhaustion.

As already mentioned, there are certain forms of abnormal alterations in the limbs which expose horses to a liability to fall. Some of these conditions are accompanied by lameness; some are not. The direction of the fall may be forwards on to the knees (*e.g.*, in over-shot knees, fetlocks, etc.) or on to the side (*e.g.*, in conditions characterised by an intercrossed or staggering gait). There are some horses that are continually liable to stumble, and may fall forwards, through no apparent abnormality (unless the surface over which they travel can be held at fault), but in others, too long a toe, too much wear of the shoe either at toe or heel, or a temporary (through overwork) or a permanent (from nervous troubles) inco-ordination of muscles, the condition is ascribable to an obvious fault.

There are certain lamenesses which produce permanent decubitus. (It is here that there is an inadequacy in most definitions of lameness.) This, which at first sight may seem paradoxical, is not really so when we consider the cause of the decubitus, *e.g.*, azoturia, postpartum paralysis, thrombosis of the iliac or axillary arteries, fractures, etc. It is always due to serious injury or disease, or a grave interference with the function of some structure in the limb or limbs affected.

The practitioner ought never to forget that an apparent impossibility to rise sometimes has its origin in decubitus itself. It may arise from insufficient feeding and nourishment when in the recumbent position for any length of time leading to a loss of strength, or it may be due to the pain and numbing of the limbs upon the ground which may be occasioned through inadequacy of bedding and a disregard of the important principle that the recumbent animal should be turned over two or three times daily.

I think the more important classes of symptoms have been briefly touched upon and classified as efficiently as their great diversity will allow.

Examination of the Lame Horse.

After having considered the lame horse from various aspects in an analytical manner, it is next necessary to suggest some of the applications of the various deductions arrived at.

It is always wise to see the lame horse in the stable before any exercise has taken place. Any special attitudes, postures, or displacements can be noticed and referred to later when it is necessary to sum up the whole of the various manifestations that are exhibited. These will occur to one's mind without any further description. The horse should afterwards be observed at the walk, and then at the trot if necessary. At the walk all the more severe lamenesses will become obvious, and the affected limb can be recognised, but with those of a milder nature only the trot will so exaggerate them that they are readily distinguishable. It must not be forgotten that there are some forms of lameness which will almost or completely disappear with exercise, so that very special attention should always be paid to the first few paces a lame horse takes. In the same way there are cases in which the lameness will become more pronounced with prolonged exercise.

Attention ought to be paid to other factors than the lameness itself. At the first glance the practitioner will recognise the type of horse with which he has to deal (saddle, harness, or heavy draught), the age of the animal (immature, mature, or aged), the condition under which it has been kept, its sex, and any malformations, or gross alterations in structure, etc., etc. He will, further, learn whether there is any co-existing disease in other systems of the body, whether the same or other limbs have been lame before, what is the duration of the lameness since it was first noticed, and whether it has altered in intensity, and numerous other points that may assist him, from a judicious questioning of the owner or his representative.

Determination of the Lame Limb.—Although in most ordinary cases it is not extraordinarily difficult to determine upon which leg the horse is lame, there are cases when it is sometimes a little difficult to make quite certain. May I just briefly, therefore, mention one or two points that may perhaps be of some assistance?

Examination of the horse in the stable is sufficient to cause one to suspect certain conditions in one or another limb, but it is never safe to depend upon this entirely. A horse that points with one fore limb one moment may be found to be lame upon the other the next, or may be found lame in one or both fore feet. Exercise is always very advisable. When a horse is being trotted out it is necessary that the groom or attendant does not embarrass the movements of the horse's

head by holding the rein too near the mouth. In some cases unscrupulous dealers may attempt to disguise a lameness by steadying the horse's head while trotting, and in slight cases they may be very successful. In the same way a horse can be made to go apparently lame, while actually he is not.

A long leading rein should be provided, and the attendant should have orders to " drop his hand " from the animal's mouth, to allow the horse complete liberty for nodding of the head, etc. With occult lamenesses a long rein permits a horse to be lunged in a circle, so that the limbs on the interior of the circle may be overworked and lameness in them may be exaggerated. The horse is first lunged in a "clockwise " direction, and if that fails to bring out definite symptoms, he should be made to turn in a " counter-clockwise " direction.

No harness, knee-caps, bandages, rugs, or other clothing should be worn, so that the observer's view of the limbs may not be obstructed, and so that the limbs may have free play.

For lamenesses which only appear " in the hot," it is necessary to have the horse worked or exercised for some considerable time before the symptoms become manifest.

Compared to the healthy limb, the lame limb has a shorter supporting period, the lifting of the foot is more sudden, the movements of swinging are slower, the posing of the foot is more careful, and the noise is less loud. In the healthy member of the same pair the weight bearing period is longer, the lifting of the foot is more deliberate, the suspension period is shorter, the posing of the foot is careless and violent, and the noise is greater.

In the horse lame in front, the head is raised and carried across to the opposite side of the body at the moment when the weight is being borne upon the lame leg. In the horse lame behind, the animal comes down on to the suffering limb in such a manner that the weight borne shall be diminished as much as possible. During the period of full weight-bearing there is less sinking of the corresponding quarter than in the normal case, and the point of the hip remains noticeably higher. When the lameness is of sufficient intensity the placing of the lame limb upon the ground coincides with a lowering of the head, and a carrying of the head towards the lame side. This is an effort on the horse's part to bear as much of his body weight on the fore pair of limbs as possible, and especially on to the healthy diagonal fore limb.

If the lameness affects both the limbs of a transverse pair, the horse shifts the weight on to the healthy pair as much as possible. When the fore limbs are thus affected, they are carried out farther forward than normally, and the hind limbs are brought up under the body to as nearly under the centre of gravity as possible. It is not rare to notice that when the horse which has been standing in this position for any length of time is asked to move he has difficulty is using the hind limbs, and some confusion may exist as to the seat of the lameness. In the case of lameness of both the hind limbs (very often due to laminitis) the horse tries to ease them from weight-bearing by placing them far forward (so as to shift the weight on to the heels) and by bringing the fore limbs as far back below the trunk as possible. Such a horse only walks with great difficulty. When all four legs are affected with laminitis, the horse places his feet in a position corresponding to that which they assume when only the fore limbs are attacked.

Occasionally, lameness in one of the fore limbs results in an abnormal movement in one or other of the hind limbs, which appears to be destined to afford a certain amount of ease to the animal. The animal at first sight appears to be lame behind. One notices, however, that this abnormal movement is produced in the diagonally opposite hind limb at the trot, but in the hind limb of the same side as the lame fore leg when the horse is walked. It is as if the horse were lame on one hind limb when he walks, and upon the opposite one when he trots. The mere fact of this apparent shift, along with the abnormality in the method of posing each of the feet in front, as well as the assistance to be gained from a minute examination of the fore feet, will assist in the determination of the affected limb.

I am afraid that to enlarge further upon a subject into which the farther one goes the more never-ending does it appear, is not possible. I hope what I have said may be of some interest, and if it is of help to anyone I shall be satisifed.

In conclusion, I would like to mention that the contents of this paper are not, of course, entirely original. I have used a good number of text-books and articles in periodicals, etc., and I think perhaps I had better mention that a number of them were in French publications, so that this will account for some of the ideas which may seem a little unusual or even revolutionary. I have, however, not included anything which to my mind has not some claims to consideration, and while I would be perhaps a little chary in accepting, say, the osteitism theory in its entirety, I at least thought it worth while to include it, as I know many of you will not have had time to peruse current Continental literature, and it is as well to know what our foreign neighbours think.

The chief publications which I have used are as follows :—

Dr. Bradley's *Limbs of the Horse.*

Sisson's *Veterinary Anatomy.*

Wooldridge's *Encyclopædia of Veterinary Surgery and Obstetrics.*

Goubaux and Barrier's *Exterior of the Horse.*

Smith's *Veterinary Physiology.*

The *Revue Générale de Médecine Vétérinaire,* vol. xxvii., No. 321, September, 1918, pp. 433-438, an article by E. Barrat; and in vol. xxix., Nos. 338 to 343, 1920, a long article by Lienaux, upon the study of lamenesses in general.

The *Revue de Médécine Vétérinaire,* Paris, vol. xcvi., Nos. 1—3, January-February, 1920, pp. 5-17.

The Veterinary Record.

31st January, 1925.

GLASGOW VETERINARY COLLEGE.

We have been favoured with a statement by the Governors of Glasgow Veterinary College "for the continuance and maintenance of the College as a Teaching Institution," and we are asked to comment upon it. We do so with some reluctance, because the subject has already been fully commented upon (*vide V.R.*, Nov. 22nd, 1924), and while there is little more to be said, we could have wished that that little might have been in support of the Glasgow School.

The statement is somewhat lengthy, and lack of space forbids our publishing it in full, but the following are the more noteworthy points in it. A brief resumé of the history of the College is given, together with an account of the Board of Management, the number of Students during recent years and their quality as proved by the results of the R.C.V.S. examinations, and the districts from which these students are principally derived. Then follow paragraphs dealing with the various sources of revenue receivable by the College, and an account of the period of anxiety through which the institution has passed owing to the uncertainty of the continuance of the grants made to it by the Scottish Board of Agriculture. We know that the Board, acting on the opinion of the Departmental Committee on Agricultural Education which reported in 1924, has now signified the discontinuance of the annual grant which has been made up to the present time. The remainder of the statement is evidently the considered plea of justification for the continuance and maintenance of the College. We regret that the case, as presented, does not appear to us to be put even so cogently as we have seen it stated elsewhere. We quote the final paragraph: "The Governors of the College look to the public of the West of Scotland to support them in their efforts to maintain the College in Glasgow, on the ground that it is a needed institution in the west, and as no good reason has been shown why an institution established over sixty years should be summarily blotted out, merely because the Board of Agriculture for Scotland cannot afford the sum of £600 to help the upkeep of certain salaries to professors in the College. Surely Glasgow should receive its fair share of public moneys in this direction as in all others."

We have already expressed our opinion upon the report of the Departmental Committee in the article mentioned above, and it appeared to us to be based upon reason. We fear that the statement of the Governors is, to a large extent, based upon sentiment, and we confess that reading it in that light our sympathy is very much with the Governors. It remains to be seen whether such an appeal, which is to be addressed to all old graduates of the Glasgow School, and to all and everyone who can by its means be influenced, will result in collecting sufficient money either to maintain the College or to endow it to such an extent that it will be free in future years from the anxiety of being dependent upon grants in aid from government and public bodies. We fear that the decision of the Scottish Board of Agriculture is irrevocable, and we presume a sum of some £30,000 or £40,000 would be needed to endow the College adequately. We know that favourable sentiment is a most valuable asset. The traditions of a well-established teaching institution are also of immense value and are not lightly to be thrown away. The *locus* of the School, linked with its traditions, and the name of its highly esteemed founder, give it an especial claim on the West of Scotland. These are undeniable facts, but they do not controvert the arguments of the Departmental Committee.

The statement of the Governors and the appeal to old graduates will soon be in the hands of many, if not all, of our members. The future of the College depends upon the response. We fear that the response will resemble the straw at which a drowning man will clutch in order to save himself, and will provide about as much security. No doubt if £600 per annum is all that is required (and this principally to provide salaries for teachers), this sum might quite well be raised annually from well-wishers, and the College so be carried on by voluntary contributions; but we cannot express any gratification or satisfaction with such a method, for a teaching institution to be really efficient must be endowed properly, and not be dependent upon voluntary support. We fear that the statement will not succeed in convincing many of the real *need* for a College in Glasgow, however convenient it may be for those in the West of Scotland, and however much we may wish to see the magnificent work of Principal McCall perpetuated. If we should prove to be wrong, we shall be amongst those best pleased, but, in the meantime, we cannot do less than express our very sincere sympathy with the Governors and the Staff of the College.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Obituary.

HAZEEL, H. A., M.R.C.V.S., Dunoon, Argyll. Graduated Glasgow, December 23rd, 1892. Died January 22nd, 1925. Aged 59 years.

Royal College of Veterinary Surgeons.

Quarterly Meeting of Council.

A quarterly meeting of Council, followed by a special meeting of Council, of the Royal College of Veterinary Surgeons was held at the College, 10 Red Lion Square, W.C., on Friday, the 9th January, 1925. The President (Mr. S. H. Slocock) occupied the chair, and the following were present:—

Messrs. Abson, Blackhurst; Sir L. J. Blenkinsop; Messrs. Bradley, Brittlebank, Buxton, Carter, Clarkson, Coleman, Craig, Gofton, Gaiger, Hughes, King, Livesey, Locke, Male; Sir J. M'Fadyean, Messrs. McIntosh, McKinna, Sir J. Moore; Messrs. Rees, Simpson, Spencer; Sir S. Stockman; Messrs. Sumner, West, Wooldridge, Willett; Mr. Thatcher (Solicitor), and Mr. F. Bullock (Secretary).

The President: Gentleman, I wish you all a Happy New Year. (Cheers).

The minutes of the previous meeting, which had been printed and circulated, were taken as read and signed as correct.

Congratulations to Sir John M'Fadyean.

The President: Gentlemen, you have all heard that a very great honour has been paid to the Senior Member of Council, Sir John M'Fadyean, who has been awarded the Degree of Doctor of Veterinary Medicine, *honoris causa*, by the Budapest Veterinary Academy. (Cheers). Another honour has been conferred upon him, which is, I believe, even greater still; he has been elected, at the head of the poll, a Foreign Corresponding member of the French Academy of Medicine. (Cheers). I would like, Sir John, to express to you the pleasure with which the Council regards the bestowal of these great honours. To us no proof was needed of the esteem in which your name is held throughout the scientific world,—I say world, because it is not confined to these Islands. We consider it only a just recognition. While it is an honour to you, Sir, we also consider it a great honour to our profession. We wish to record our congratulations to you, Sir John, and in the name of the Council I now convey those congratulations to you. (Cheers). There is also a further congratulation I should like to convey. H.M. The King has seen fit to honour the eldest son of Sir John M'Fadyean, by creating him a Knight Bachelor. (Cheers). It must have been with a great sense of pride that Sir John and Lady M'Fadyean heard of the inclusion of their son's name in the New Year's Honours list. I convey to you, Sir, with the greatest pleasure, the congratulations of the Council. (Cheers).

Dr. Bradley: Sir, if you would allow me I should esteem it a very great privilege to be allowed to second this motion. It is a privilege that unfortunately carries with it its own penalty, because I feel that any words that are within my powers of expression are quite inadequate to convey to Sir John M'Fadyean the feelings of this Council, and I think I may go further and say the feeling of the whole profession to which he belongs. (Cheers). Fortunately for me, very little need be said in support of the vote, for I am well aware that all in this room, and outside the room, belonging to the profession, are warmly grateful to the Foreign Powers that have given recognition of the scientific standing of a member of our own profession. If one may be permitted to express it in this fashion, I would say that the honour is not exclusively upon Sir John M'Fadyean, but is partially at least—(at any rate we wish to think a little of it is)—on the profession as a whole. The profession at the moment is basking in the reflected glory. There is not one of us, however, who for a single moment suggests that the honour is reflected upon Sir John any the less. I think I may go a little further and say that the French Academy of Medicine, in electing Sir John to its body has, in a manner, done so to its own benefit, for one can safely come to the conclusion that the Academy has very materially strengthened the scientific side of its Corporation. (Hear, hear). Mr. President, with these very few and extremely inadequate words I desire to second the vote of felicitation to Sir John on the honours that have been conferred upon him. (Cheers.).

Mr. Abson: Mr. President, I would like to have the privilege of supporting the motion proposed by the President, and so delightfully seconded by Dr. Bradley. I have nothing to add; in fact, words fail me in attempting to add anything to what has been expressed by both the previous speakers. I rise, however, because I am the next oldest member of this Council to Sir John M'Fadyean, and I should not like the occasion to pass without supporting with all my heart the motion which has been so ably proposed and seconded. (Cheers).

The resolution was carried by acclamation.

The President: Sir John, allow me to convey to you the sentiments of the Council and of the profession. (Cheers).

Sir John M'Fadyean, who was received with very hearty cheering on rising to reply, said: Mr. President and Gentlemen: Allow me, in the first place, to express my sincere and grateful thanks to you, Mr. President, and to Dr. Bradley and Mr. Abson for what you have been good enough to say in proposing, seconding and supporting the proposal which has just been carried. In the second place, I desire to tender my equally grateful thanks to the other members of this Council who are here present. It is an honour which I did not expect. It is on that account all the more agreeable to me; but I absolutely despair of being able to find words in which to express exactly the thoughts that are passing through my mind at the present time. At any rate, I was going to say that modesty would forbid that I should concur in everything that was said by the mover and the seconder, but there is one remark they made with which I can most heartily agree, and that is that the honours in question were not entirely personal, but were honours conferred upon the whole profession. (Cheers). I can say without any hypocrisy that it is in that sense that I value them particularly highly.

I think I might almost be allowed to say on an occasion like this that one really does take it as a recompense for any work that one has done. With regard to the congratulations concerning the honour that has been conferred on my eldest son, I need only say that I shall certainly convey to him what was said in that connection on this occasion. I have no doubt he has received many congratulations on the honour which His Majesty has conferred upon him, but he will not value any of them more than the congratulations which I shall be able to convey to him from you. (Cheers).

The SECRETARY announced that a letter regretting his inability to attend the meeting had been received from Mr. P. J. Howard.

OBITUARY.

The SECRETARY read the Obituary List, all the members standing.

The SECRETARY had received a notice from the Secretary of the Royal Sanitary Institute, requesting the Council to appoint delegates to the Congress of the Institute to be held at Edinburgh from July 20th—25th, 1925. A Conference of Veterinary Inspectors would form part of the Proceedings of the Congress. It was unanimously agreed that the President for the time being and one of the Vice-Presidents, or substitutes appointed by the President, should be appointed as the delegates of the College, and that their expenses be paid.

The SECRETARY read the following letter from Professor Nicolas, the Director of the National Veterinary School at Alfort, acknowledging the receipt of the resolution which was passed by the Council at its last meeting.

(TRANSLATION).

MINISTRY OF AGRICULTURE.

National Veterinary School,
Alfort,
3rd November, 1924.

TO THE SECRETARY R.C.V.S.

Dear Mr. Secretary,

I am happy to inform you that the teaching staff of the Alfort School, at their meeting on Friday, last, having heard read the address of congratulation on the occasion of the hundredth anniversary of the publication of the *Recueil de Médecine Vétérinaire*, voted by the Council of the Royal College at its meeting on the 16th October, unanimously resolved that the following letter be sent in reply to this cordial manifestation:—

The teaching staff of the Alfort School, professors and heads of department, moved by the delicate thought which the Royal College has expressed and appreciating particularly the very warm congratulations so cordially passed on the hundredth anniversary of the foundation of the *Recueil de Médecine Vétérinaire*, desire to express, with their sincerest thanks, to the Council of the College their deep sense of gratitude and of cordial fellowship.

The teaching staff, deeply touched by the flattering appreciation which the Council of the Royal College has so kindly expressed of the work accomplished by the *Recueil* and of the value of the teaching given at Alfort, are united in the desire of striving to continue the work commenced 100 years ago, and of maintaining untarnished the lustre which eminent and incomparable teachers have thrown on the journal and on the school.

Yours faithfully,

E. NICOLAS.

The SECRETARY read the following letter from Mrs. Thatcher, dated October 12th, 1925:—

Dear Mr. Bullock,

Thank you for your letter. Will you please convey my thanks and the thanks of my family to the President and the Council of the Royal College of Veterinary Surgeons for their kind sympathy in my great loss and for the very kind terms in which they have spoken of my dear husband. With kind regards, Yours sincerely,

N. E. THATCHER.

The SECRETARY announced that he had received letters of thanks from Mr. Christopher Jones, Mr. Edward L. Butters, and Major Archibald Baird for their re-election as Local Secretaries for Examinations.

ADMISSION OF MEMBERS.

The SECRETARY announced that, since the last quarterly meeting, the following had been admitted as members:—

The Veterinary College of Ireland, Dublin:—

Best, J. H. B., Burke, J. A., Burke, N., Cassells, R. W., Comer, E. A., Clarke, G. E., Dunlop, W. W., Hogan, T. F. C., Hyde, J., Hyland, F. J., Kane, J. J., Kellett, J. R., Milcoyne, M. F., Kyne, J., Morrin, G. A., Nally, J. F., O'Hara, T. F., O'Reilly, D., Poer, L. H. B., Purdy, H. K., Rosborough, J. E.

Glasgow Veterinary College:—

Barbour, D. S., Dykes, G., Mitchell, J., Smith, W. C.

Royal (Dick) Veterinary College, Edinburgh:—

Bain, R. F., Cowin, G. S., Davies, H., Forbes, J. T., Innes, J. R. M., Isherwood, W. P., Jamieson, G. R., Jones, W., Kerr, W. R., Larnach, A. M., McRorie, J. M. T., McShane, H. G., Mitchell, J. G. C., Runciman, W., Snodgrass, P. L., Watson, R. J. P.

Veterinary School, Liverpool University:—

Beckett, F., Booth, F., Elliott, W. B. J., Shuttleworth, A. C., Storrar, J., Watson, L. A.

Royal Veterinary College, London:—

Boucher, H. L., De Wet, G. J., Elphicke, C., Emson, P. E., Howell, W. E., Pugh, C. J., Stephens, J. C., Stephens, J., Swaby, R., Theiler, H., Turner, K. D.

PRESENTATION OF THE STEEL MEMORIAL MEDAL TO MR. A. LESLIE SHEATHER, B.Sc., M.R.C.V.S.

Mr. Leslie Sheather was called into the Council Chamber, and the PRESIDENT addressed the following remarks to him: "Mr. Sheather, this Council has it within its power to present a Medal to a member who has done really good scientific or literary work on behalf of the profession. The Medal is known as the Steel Memorial Medal. It commemorates a name that is dear to many of us, because it is the name of a man who was one of the finest teachers of his day. The Council has decided that, in its

view, you are a man who has rendered good service to the profession in the scientific and literary works that you have given to it, and it is their wish that the Steel Memorial Medal should this year be conferred upon you. I ask you now to accept it from the Council, who are assured that your good work will continue and increase. (Cheers).

The PRESIDENT then presented the Medal to Mr. Sheather.

Mr. A. LESLIE SHEATHER, who was very warmly welcomed, said :—" Mr. President and Gentlemen of the Council. It would be idle for me to deny that I feel a certain amount of personal pride in having been awarded this Medal. Efforts have been made in the past to help on scientific work in the veterinary profession, but it is only just lately that we see a chance of doing it under satisfactory conditions. In the past we have been hampered. Apart from the personal pride which I feel in having been thought worthy to be the recipient of this Medal, the thought that is uppermost in my mind is that I owe a great deal, in fact practically all, to my teacher, Sir John M'Fadyean (Cheers). He has always helped and encouraged me through a good many years. I am afraid sometimes, perhaps he has had to bear with me, but still it is to Sir John primarily that I owe the honour which has been conferred upon me to-day. (Cheers). Gentlemen, I thank you for having considered me to be the right man upon whom this honour should be bestowed. (Cheers).

(Mr. Sheather then withdrew).

FINANCE COMMITTEE.

Mr. MCKINNA read the following report of the Finance Committee, and moved its reception and adoption :—

I. *Minutes.*—The minutes of the previous meeting, having been printed and circulated, were taken as read, and signed as correct.

II. *Financial Statement.*—The Treasurer submitted his Financial Statement for the quarter showing a balance in hand of £910 0s. 5d. and liabilities amounting to £1,226 16s. 0d.

It was resolved that the Treasurer's statement be approved and that he be ordered to pay the liabilities shown, together with cheques for monthly salaries, petty cash and wages, gas, electric light, repairs, and examination expenses.

III. *Smoke Pipe.*—A resolution was received from the Chairmen's Committee recommending that the smoke pipe from the furnace be carried to the top of the building at an estimated cost of £15 18s. 6d.

It was resolved that the recommendation be approved.

IV. *Ventilating Fan.*—A resolution was received from the Council Room Sub-Committee recommending the installation of a ventilating fan in the room above the Council Room, connected by means of a grating in the ceiling to the Council Room, and the provision of an inlet under the front window, together with an estimate submitted by Messrs. James Keith and Blackman Co., to carry out the work for the sum of £62 12s. 6d. The Sub-Committee recommend that the estimate be accepted, and that on further satisfactory estimates being obtained for the necessary builders' work, they be empowered to have the scheme carried out.

It was resolved that the recommendation of the Council Room Sub-Committee be approved.

V. *Architect's Report.*—On the recommendation of the Library Committee it was resolved that an architect be employed to examine the fabric of the building and to report on the state of the structure, at a cost not to exceed £15 15s. 0d.

VI. *Annual Fees in Arrear.*—The Secretary reported the action taken in certain cases for the recovery of annual fees in the County Court, and he was authorised to proceed in the remaining cases.

VII. *Waiter.*—An application was received from Mr. W. Souch on his retirement as waiter, a position he had held for the past 47 years, for a small allowance.

It was resolved that a grant of £5 be made to Mr. Souch.

The motion for the reception and adoption of the report was carried unanimously.

EXAMINATION COMMITTEE.

Mr. GOFTON read the following reports of meetings of the Examination Committee and moved their reception and adoption.

Special Meeting.

I. *Teaching and Examination in Anatomy.*—The question of the advisability of instituting one examination in anatomy at the end of the second year's course, in place of the present system, was considered.

Dr. Bradley proposed, and Mr. Spencer seconded :—

That the principle of holding one examination in anatomy at the termination of the second year's course be adopted, and that a Sub-Committee be appointed to work out the details of the proposed change, and to submit recommendations for consequential alterations of bye-laws.

Sir John M'Fadyean moved as an amendment that the following words be inserted after the word " adopted " :—

" With the proviso that the adoption of this system shall be optional on the part of each school."

Mr. Male seconded, but on being put to the vote the amendment was lost.

The original motion was then put and carried.

Ordinary Meeting.

I. *Minutes.*—The minutes of the previous meeting, having been printed and circulated, were taken as read, and signed as correct.

II. *Reports on December Examinations.*—Reports from the Chairmen of the Board of Examiners, Local Secretaries and Delegates on the examinations held in December, were submitted and considered, and it was resolved that the reports be approved, and that the thanks of the Council be conveyed to those persons and institutions who had rendered assistance in the conduct of the examinations.

III. *Fellowship Examination.*—(*a*) The Secretary reported that two examinations for the Fellowship Diploma had been held, namely, in London on November 20th, the candidate being Mr. Colin Davenport, and in Liverpool on December 19th the candidate being Mr. L. W. Wynn Lloyd. Both candidates were successful.

(*b*) An application was received from a prospective candidate asking whether a Thesis would be accepted if either a part or the whole of it had been previously published. The Secretary was instructed to reply that no objection would be raised to a Thesis merely on the ground that part of the matter had been previously published.

IV. *D. V.S.M. Examination.*—The Secretary reported that a re-examination of candidates for the D.V.S.M. examination had been held at Edinburgh and London from November 29th-December 4th when seven candidates presented themselves, the following being successful :—R. C. U. Fisher, T. M. Doyle, A. A. Forsyth, and H. C Gregory.

V. *Educational Certificates.*—(*a*) Educational Certificates Nos. 2868-2891, and 2894-2897 were submitted and approved.

(*b*) The Educational Certificate No. 2898 was found to be fraudulent, and it was resolved : (1) That the matter be referred to the Solicitor for his opinion as to the correct course to be taken ; (2) That subject to such opinion, an intimation be sent to the College at which the student has been admitted pointing out that the certificate is fraudulent and cannot be accepted, and that the student must be informed that no certificate can in future be accepted from him.

VI. *Exemptions.*—Applications were received from candidates Nos. 2892 and 2893 for exemption (on the grounds of military service, and of certain educational certificates submitted) from the regulation governing Preliminary Examinations.

It was resolved that the applications be not acceded to.

VII. *Concessions.*—Applications were received from military service candidates who had failed in one subject only at the December examinations for permission to pass to the next year's course conditional upon their presenting the required subject at the next examination.

The applications were acceded to in three cases.

VIII. *Examination Fees.*—Medical certificates were submitted in respect of two candidates who were unable to sit at the examination in December owing to illness.

It was resolved that the examination fees paid be held over to the July examinations.

IX. *Scottish Universities Entrance Board.*—The Secretary submitted the question of the recognition of the certificate granted by the Scottish Universities Entrance Board admitting adult students to matriculation without strict compliance with the usual requirements as to examinations.

It was resolved that such certificates be not accepted without the submission of proper evidence that one of the recognised examinations in general education has been passed and that the certificates include the required subjects.

X. *Scottish Education Department.*—It was resolved : (*a*) That the new Day School Certificate of the Scottish Education Department be recognised as qualifying the holder in respect of general education to enter upon the course of study for the Membership Diploma provided it contains the required subjects.

(*b*) That the Lower Leaving Certificate and the Intermediate Certificate as awarded up to the year 1924, be no longer approved after the termination of the year 1927.

XI. *Application by Students' Representative Councils.*—An application from the Students' Representative Councils was received to the following effect :—

1. That a student failing in a subject be only required to present himself for re-examination in that subject.
2. That a student failing in one subject only be allowed to pass to the next year's course conditional on his passing in that subject before being allowed up for examination in the following class.

It was resolved that no action be taken.

XII. *D. V.S.M.*—A letter was received from the Civil Service Commission in reference to the proposal of the Council made at the meeting on April 11th, 1924 (see minutes, paragraph 17), enquiring whether, in the event of the proposal being accepted, the College would be prepared from time to time to consider any suggestions made by the Ministry as regards alterations in, or amendments of, the syllabus for the Diploma in Veterinary State Medicine, and also as to the pass marks that should be required.

It was resolved to recommend that the Secretary be instructed to reply in the affirmative.

XIII. *Meat Inspection.*—A letter was received from Mr. A. M. Trotter with regard to the teaching and examination in Meat Inspection, and it was resolved that the matter be referred to the Sub-Committee to be appointed to consider the revision of the regulations for the D.V.S.M.

XIV. *D. V.S.M. Regulations.*—It was resolved : (*a*) That a Sub-Committee be appointed to consider the question of the revision of the regulations for the D.V.S.M., and to report.

(*b*) That the Sub-Committee consist of the Chairman, Dr. Bradley, Professors Buxton and Craig, Sir John M'Fadyean, Mr. T. F. Spencer and Sir Stewart Stockman.

XV. *D. V.S.M. Fees of Internal Examiners.*—The Secretary reported that on the instructions of the Treasurer he had obtained the opinion of the Solicitor to the effect that no Examiner who is also a member of Council should receive any fee or remuneration for his services as such.

XVI. *D. V.S.M. Concessions.*—(*a*) An application was received from a student rejected at the recent examination for exemption on the grounds of war service from further attendance at the course.

It was resolved that the application be granted.

(*b*) Applications were received from the following for exemption from part of the period of 15 weeks instructions under a veterinary officer :—

Smythe, A. R., late R.A.V.C., 5 years' service ;
Johnston, D., 4 years' war service, 9 months temporary inspector Ministry of Agriculture.

It was resolved that the applications be acceded to.

(*c*) Applications were received from the following military service candidates for exemption from attendance at the course :—

McGregor, J. G., Captain late R.A.V.C., 5 years' service ; Assistant Veterinary Inspector, Lanarkshire, 5 years ; post-graduate course.
Sewell, E., M.C., Captain R.A.V.C., 4½ years' service ; late teacher of Hygiene, Milk and Meat Inspection and Bacteriology at the Punjab Veterinary College ; two post-graduate courses ; Assistant Veterinary Inspector, Birmingham.
Fox, J., M.C., Captain R.A.V.C., 5 years' service ; Veterinary Officer, Ministry of Agriculture ; post-graduate course.

It was resolved that the applications be acceded to.

XVII. *Election of Examiners.*—A draft advertisement for the election of Examiners was submitted and approved.

The report was adopted unanimously.

Prof. GOFTON : In the report of the special meeting of the Examination Committee it was decided to recommend that a sub-committee be appointed to work out the details of the proposed change in regard to the teaching and examination in anatomy, but no recommendation was made as to the composition of the Sub-committee. It seems to me it would save time if a Sub-committee of the Examination Committee were now appointed for that purpose. On the last occasion on which a recommendation to this effect came before the Council a recommendation was also sent forward submitting the names of the members of the Examination Committee, whom it was considered might properly form a Sub-committee for this purpose. I have extracted those names, and with addition I beg to move that those gentlemen be elected a Sub-committee for the purpose described in the minutes, namely, Dr. Bradley, Professor Buxton, Professor Craig, Professor Share-Jones, Sir John M'Fadyean, the President, the Chairman of the Examination Committee.

The PRESIDENT : Do you propose that the Committee be appointed by this Council ?

Mr. GOFTON : Yes, as a Sub-committee of the Examination Committee. To report to the Examination Committee and then on to the Council.

Mr. Gofton's motion for the election of the Sub-committee was then put and carried unanimously.

(To be continued.)

CLINICAL AND CASE REPORTS.

Two Unusual Cases of Debility.

By Capt. E. S. W. Peatt, R.A.V.C.

I. Aneurism of Posterior Aorta.

Subject.—A grey gelding, aged seven, 15-1½ hands high, a riding horse.

History and Symptoms.—From the 17th of May until the 16th of July this animal was treated for debility in hospital, indigestion being diagnosed as the cause. The horse improved somewhat, and on the latter date was returned to light duty, but after a trial of two or three weeks he became unfit for work, and was turned out to grass on the 6th of August. In spite of special diet and the administration of tonics, the animal continued to do badly and lose condition. The mucous membranes were anæmic, the coat dry and staring, and the attitude listless.

On the morning of the 12th of October the horse was found dead in a field.

Post-mortem.—The abdominal cavity was filled with blood.

On careful manual examination of the viscera a large growth was felt in the left sub-lumbar region closely attached to the roof of the abdomen. On dissecting out the growth, which was as large as a Rugby football, it was found to be an enormous aneurism of the posterior aorta, occurring roughly about the point where it gives off the iliac arteries. The walls of the aneurism were in some places of a cartilaginous nature, almost bony; the lumen of the dilated vessel was roughly spherical, with numbers of protuberances, and it had a capacity of eight pints. The protuberances were of a caseous consistence, varying in size from that of a hen's egg to a billiard ball, and were apparently thrombi which had formed at the entrances to the subsidiary branches of the aorta.

The aneurismal mass was adhering to the spleen, and had enveloped the left kidney.

The cause of the internal hæmorrhage and death was found to be a rupture in the wall of the aneurism which admitted the passage of two fingers, and was situated at the junction of the aneurism with the left kidney.

II. Gastric Dilitation.

Subject.—Bay gelding, aged five, 16 hands high, a riding horse.

History and Symptoms.—For a period of twelve months this horse continued to do badly and lose condition, and before death was emaciated and very weak. The animal was subject to repeated sub-acute attacks of colic, and it was noticed that such an attack invariably occurred if the horse was turned out to grass, and occasionally if long hay was fed. Intestinal parasites were suspected, but a microscopical examination of fæces proved negative, as also did the tuberculin test.

The usual methods of treatment for such a condition were tried without success, and on the 11th of November, 1924, the horse died suddenly, having shown slight signs of abdominal pain just before death. Prior to death the most marked symptoms were emaciation, anæmic mucous membranes, slight diarrhœa, and continuous peristaltic sounds.

Post-mortem.—On opening the abdomen, the stomach was found to be enormously enlarged, and appeared to occupy the entire abdominal cavity. It had a capacity of nine gallons, and was completely filled with undigested food, which must have been eaten over a period of two or three days.

Examination of the pyloric opening of the stomach revealed the fact that this orifice was practically occluded, and only with difficulty could a pencil be forced through into the duodenum. The stricture affected two or three inches of the duodenum, in addition to the pylorus.

When slit up and exposed, the mucous membrane of the affected part proved to be greatly hypertrophied and ulcerated, and to contain numerous deep pits and hard nodules, some of the latter containing a clear, sticky fluid, others being of hard connective tissue.

The liver was cirrhotic and small, the cortex showing a network of connective tissue ramifications and numerous small star-shaped cicatrices.

The heart was small and flabby; all the other organs in the abdominal and thoracic cavities appeared to be normal.

Conclusions.

Death was caused, no doubt, by heart failure, following continual compression of the thoracic viscera by the enlarged stomach, through the diaphragm.

Two theories may be advanced as to the original cause of the condition.

(a) That the stricture was the result of chronic gastritis.

(b) That the original lesion was in the liver, where the cicatrices were probably the sites of numerous abscesses most likely caused by the *streptococcus equi*.

Infection may have travelled by way of the bile duct to the duodenum and caused abscess formation, with consequent thickening and ulceration of the mucous membrane, resulting in stricture of the bowel, and consequent gastric dilatation.

Use of the Stomach Tube in Horses.

"Every so often I read an article in regard to using the stomach tube, but nothing is said regarding the method of passing it via the mouth by strapping the mouth shut and passing the tube through the interdental space. To me this method far excels all others. The horse will not fight the tube the least bit, and neither is there any hæmorrhage following.

"The mouth is strapped shut, preferably with a halter made for that purpose. The tube (heavy black tube, commonly known as Cahill tube) is oiled and inserted in the interdental space, and passed into the œsophagus without further ceremony. The ease with which it is passed with no opposition from the horse and no hæmorrhage, makes it the ideal way for administering medicine."

A. N. Overbaugh, in *Veterinary Medicine.*

Review.

Annual Statistical and General Report of Army Veterinary Services for the Year 1923-1924.

The Annual Statistical and General Report of Army Veterinary Services for the year 1923-1924 has been received. The report deals with the health of the animals in Home Commands and Overseas Forces, together with reports of the Royal Army Veterinary Corps School and the School of Farriery, both of which are at Aldershot.

The Statistical Tables show in a remarkably clear and concise manner a highly satisfactory degree of health generally, and an efficient maintenance of the same by a service which is well adapted under all circumstances for that purpose.

It is sad all the same to note the enormous reduction in the strength of animals of the Army in Home Commands from pre-war figures. In the year under review the total strength stood at 11,795 horses and 1,208 mules, while in pre-war days the total strength was roughly 22,000 horses, a reduction therefore of practically half the strength in animals. The reduction is due in part to that retrenchment in cost which always follows war, but the lesser number of animals is also occasioned by the increasing "mechanicalization" of the Army.

As regards health the average number of animals daily under treatment in Great Britain and Northern Ireland was 4·85% horses, and 2·67% mules, and the average sick time for each case was 21·26 days for horses, and 22·06 days for mules. Wastage, i.e., deaths and disposals for veterinary reasons for the year amounted to 6·44% horses and 3·31 mules. 83·29% horses and 44·20% mules of the total strength in Great Britain and Ireland were admitted for treatment during the year as compared to 68·96% horses in the previous year. This increase in case incidence was due to the large influx of remounts during the year (2,930 horses as compared to 1,387 horses in 1922-1923) and disease associated with young and untrained animals. It is interesting to remark that 25% of the horses of the Army are remounts, and that the average age of the total of animals is 11·28 years (horses) and 9·35 years (mules).

Respiratory diseases account for 8·521% of admissions an increase on the previous year: there was also an increase in specific disease, i.e., Strangles, both increases being attributable to remounts. The same reason applies to an increase of skin diseases of the ringworm and acne type. It is to the credit of Army Veterinary Service that not a single case of mange or glanders was met with.

Digestive disease was much less, and there was a substantial decrease in admissions for injuries, the case incidence being 38·855% as compared to 46·870% for the five years 1911-13 and 1922-23. Stables injuries were remarkably small (144 recorded in horses and none in mules), and generally speaking a well marked improvement in stable management was disclosed. Vaccine therapy for chronic catarrh was practised in the Aldershot Command with considerable success.

The boarding-out scheme having been abolished, the number of horses boarded out is gradually diminishing, and stood at 2,410 on 1st April, 1924.

The general health and condition of animals with the British Army of the Rhine has been very good. With 1,363 horses and 311 mules, admissions for treatment amounted to 71·33% and 26·68% respectively, and the average number daily under treatment was 3·91% and 1·96% of strength of each class of animal.

In the British troops in Egypt with a strength of 2,584 horses and 1,413 mules, admissions for treatment for the year amounted to 118·18% horses and 71·69% mules, with a daily number under treatment of 5·78% and 3·56% respectively. On the other hand the average length of time under treatment was 17·83 days (horses) and 18·13 days (mules).

It is of interest to note that 678 young Australian remounts were received, and on the withdrawal of troops from Turkey, there being no market in Constantinople, a considerable number of horses and mules were sent from that country and from Palestine to Egypt for disposal. As a result sand colic prevailed heavily in the remount depôt at Kantara (31% of strength of the depôt). Very satisfactory research was carried out at the veterinary laboratory into the cause of specific ophthalmia, and the testing of a serum obtained from animals hyperimmunised with an organism recovered from the anterior chamber of an affected eye and the blood stream.

Nine courses of instruction were held during the year at the R.A.V.C. School at Aldershot, viz., two for regular officers R.A.V.C. (3 months), two for territorial officers R.A.V.C. (12 days), two in Animal Management for officers of combatant branches of the Army (1 month), and two in Animal Management for non-commissioned officers (6 weeks). Excellent laboratory work was achieved, including the production of 3,602 doses of subcutaneous and 6,860 doses of intra-dermo-palpebral mallein.

The School of Farriery, Aldershot, also showed good service, both in instructional and productive work. 115 pupils attended the school during the year, of which 65 qualified, and 40 were remaining under instruction at the end of the year. The average daily number under instruction was 39·61, and the average period each pupil was under instruction before being qualified as a farrier was 7 months.

2,732 horses were shod during the year, 10,930 shoes put on, and 1,850 shoes made.

J. M.

Army Veterinary Service.

London Gazette—War Office—Territorial Army.

January 13th.—R. B. H. Murray to be Lieutenant (July 17th, 1924).

DIVISIONAL REPORT.

Central Division.

A well-attended meeting of this Division was held at the R.C.V.S., 10 Red Lion Square, W.C.1., on the evening of Friday, January 2nd, 1925.

The PRESIDENT, Major P. J. Simpson occupied the chair, and there were also present Messrs. L. S. Balls, W. Brown, R. Bryden, Capt. C. Davenport, Major G. W. Dunkin, Capt. W. P. Edwards, John Heath, Major F. T. G. Hobday, P. S. Howard, H. C. P. King, Herbert King, Hamilton Kirk, G. H. Livesey, Major Herbert Mason, J. W. McIntosh, Major W. J. Mulvey, H. J. Parkin, W. Perryman, L. P. Pugh, Col. H. A. Reid, S. H. Slocock, Capt. S. L. Slocock, F. H. Stainton, W. F. Widden, J. D. Williams, A. E. Willett, J. Willett, Professor H. A. Woodruff, Col. T. D. Young, and J. F. Macdonald, Hon. Secretary.

Visitors.—Messrs. C. Elphicke, D. Johnstone, E. C. Lloyd, E. Peacey, A. R. Smythe and A. W. Stableforth.

The minutes of the dinner meeting were confirmed and signed, but the signing of those of the December meeting was deferred, pending the completion of their publication in the *Record*.

Correspondence.—The Secretary announced the receipt of the following letters:—From the Western Counties Division, acknowledging with pleasure the receipt of a resolution in regard to payment for veterinary inspection at dog shows; also acknowledging the Society's sympathy in regard to the death of the Western Counties Hon. Secretary, Mr. W. P. Stableforth; from the General Secretary of the N.V.M.A., acknowledging the receipt of Sir John Moore's resolution for consideration by Council; from Messrs. Catmur, Dalling, Dunlop Martin, Major Rees Mogg, Maj.-Gen. Sir John Moore and Mr. H. L. Roberts, apologising for absence.

Nominations.—Messrs. E. C. Lloyd, Joseph Stevens and L. T. Whitby were nominated for Fellowship.

Elections.—Mr. W. H. Andrews (Camden Town), R. Catmur (Abingdon), Captain Colin Davenport (Aldershot), Mr. W. W. Golding (Hertford), Captain R. C. G. Hancock (Beaconsfield), Captain R. H. H. Over (Rugby), L. P. Pugh (Sevenoaks), C. N. Thompson (London), Major F. W. H. Thomas (London), Major Herbert Mason (London), Captain F. C. Minett, Captain T. M. Doyle (London) and Mr. J. D. Williams (Hounslow).

MORBID SPECIMENS.

Capt. W. F. WIDDEN: I have here two femurs from a nine-year-old sheep dog, and I wish to point out the peculiarity of the fact that a very pronounced difference in colouring exists between the healthy bone and the fractured bone. This fracture occurred six weeks ago and involved the top of the trachea. I did not diagnose the trouble, which I thought was due to a severe arthritis. I advised destruction, which was carried out, and on *post-mortem* examination this striking difference in colour was revealed.

Captain H. KIRK: I have here the kindeys and bladder removed from a five weeks old mongrel terrier puppy. The carcase was sent to me for a *post-mortem* report, but I obtained no history whatever of the symptoms displayed. This appears to me to be a case of hydro-nephrosis, which is extremely rare in the dog. It is considerably *more* rare in so young an animal. In the first place you will observe that both kidneys are greatly enlarged. Upon cutting one in half, I discovered that the medulla had completely disappeared, its cavity, and that of the pelvis being filled with a thin milky fluid. After emptying this fluid away, considerable glairy mucous material was observed adhering to the walls, and may, even now, be still seen on the specimen.

Hydro-nephrosis, as you all know, is the result of some obstruction either in the ureter or bladder, which prevents the urine from reaching the bladder. The obstruction in *this* case is seen in the neck of the bladder exhibited, which is greatly thickened and indurated, and cuts like a fibroma. The cause of this induration has, however, not been discovered. The inner surface of the bladder was inflamed and had thick diphtheritic deposit adhering to it in several places. The death of this puppy was probably due to uræmia. I have no doubt but that had this puppy lived, the cortex of the kidney would also have atrophied, the kidney being eventually reduced to a mere thick walled sac full of fluid. As you will see both kidneys are affected, one being worse than the other.

Mr. L. S. BALLS: I have here a Chow puppy, which lived for twenty-four hours, and was one of three. This one's head was shaped like that of a rat; it also possessed a very definite cleft palate. All the time the bitch was pregnant she was mad on rats and I was wondering whether, as is so often the case in the human subject, maternal influence or obsession could have influenced the production of this creature. I desire also to exhibit these numerous urinary calculi, passed by a Pekingese bitch. She is alive and doing quite well, after twelve months, during which she has passed no more calculi.

Professor WOODRUFF: These two kidneys (referring to Captain Kirk's exhibit) are not the same—one shows a lesion, but the other is practically normal. One would have imagined that a central lesion at the neck of the bladder would have produced an effect upon both kidneys to the same extent *i.e.*, that you would have had a bi-lateral dropsy instead of a uni-lateral one.

I should like to know whether the animal was a dog or a bitch puppy, whether the cystitis had been diagnosed before, and if so, for how long, and what the preliminary treatment had been. The cystitis has previously affected the exit of one ureter and not of the other, and therefore you have a uni-lateral affection of the kidney. I quite agree the case is one of hydro-nephrosis.

CAPTAIN KIRK: I quite appreciate the point. I was certain that the neck of the bladder was extremely thickened, and that there was fibrosis there. The other ureter was, I believe affected.

Mr. PERRYMAN: One ureter appears to be absent.

Col. YOUNG: I have seen hundreds of cases of hydro-nephrosis, but invariably you do not get this milky fluid.

The PRESIDENT: Was the bladder found very distended on making a post-mortem examination? Because if the hyrdo-nephrosis is the result of constriction at the neck of the bladder, one would expect to find the condition much more common than it is amongst toy dogs, who are kept in the house for many hours on end, and in whom, therefore, a distended bladder is very frequent. With this in mind, it seems curious that retention of urine should cause hydro-nephrosis.

Captain KIRK: I should have made it clear that there was no more than a quarter of a dram of urine in the bladder. In completion of my previous reply, I might say that the animal had had no treatment—it was only five weeks old—and the sex was male.

Mr. PUGH: In connection with the puppy, it has been suggested that maternal impression caused this rat-like appearance; why, then, were the other two puppies normal? If it worked through hormones it could not affect the one only.

Mr. BALLS: Strange to say, that puppy was the colour of a rat; the other two were red and cream respectively, and perfect pups.

Captain KIRK: It does not follow that because one animal in a litter is deformed the others will be.

Major HOBDAY: In connection with the cleft palate, that, of course, is not an uncommon thing, but I had a very interesting photograph sent to me a few days ago by Major Hodgkins, relating to a case in which a bitch was lined by two distinct breeds of dog, a Saluki and a Collie, and she has conceived twice, once by the Saluki and once by the Collie. It is of interest as showing that two conceptions may take place at the same time of œstrum. I have another instance of the same, with a Sealyham and a Cocker spaniel. Some breeders have the impression that the presence of a long-haired dog, held in view of the bitch at the time of mating, will cause the bitch to throw long-haired pups.

A vote of thanks was passed to those who had contributed to this section of the proceedings.

ANY OTHER BUSINESS.—Under this heading, Capt. H. KIRK moved a reference to Council in the matter of the printing of the proceedings of the Society in book form every year.

Mr. MCINTOSH said that the Council had already decided that the re-printing of papers read to the Society would be too expensive, and he thought the same would apply to Capt. Kirk's proposal. The proposition failed to find a seconder.

Capt. S. L. SLOCOCK then presented a paper on "Serum Immunity."

(This paper, which promoted a good discussion, is published, together with the latter, elsewhere in this issue.—Ed.).

Captain Slocock was accorded a very hearty vote of thanks for his paper, and the proceedings terminated with an acknowledgement to the President for his conduct of the meeting. J. F. MACDONALD,

Hon. Secretary.

ABSTRACT.

OFFICIAL REPORT ON THE 1923-24 FOOT-AND-MOUTH DISEASE OUTBREAK.

The outbreak of foot-and-mouth disease during 1923 is dealt with in the Annual Report of Proceedings under the Diseases of Animals Acts during the year, which was issued by the Ministry of Agriculture on Tuesday.

With the single exception of the outbreak of 1922, which extended to 1,140 infected premises, the number of outbreaks in any one year since 1884 had never exceeded ninety-five. In 1923, however, the number of outbreaks had, up to December 31st, reached 1,929, and during the first five months of 1924 there were 1,203 newly infected premises, bringing the total to 3,132 outbreaks from the beginning of 1923 to the end of May 1924.

The most serious feature of the outbreaks in 1923-24 was the multiplication of apparently widely separated centres of infection between which no connection (with few exceptions) has been traceable. There were no fewer than 91 of these separate centres over the whole period from August, 1923, to May, 1924 (inclusive), and for five months of this period continuously as many as twenty-one of these were active centres of infection.

The number of animals slaughtered in the whole calendar year 1923 and the amount expended in compensation had by December 31st, 1923, reached the following figures:—

69,256 cattle, 26,170 sheep, 33,304 pigs, 55 goats. Compensation (estimated) £2,208,706.

The corresponding figures for the series of outbreaks covering the period from August 27th, 1923, to May 31st, 1924, were:—104,076 cattle, 43,684 sheep, 48,005 pigs, 128 goats. Compensation, £3,325,286.

No cases of rabies were confirmed in Great Britain during 1923. Diagnostic inquiry in eighty-two cases yielded negative results. There were during the same period 1,968 cases of swine fever confirmed, while 724 outbreaks of anthrax occurred, an increase of 209 on 1922.—*The Times.*

NOTES AND NEWS.

Diary of Events.

Feb. 4th—Annual Meeting and Dinner of the South Eastern Division at Tunbridge Wells.

Feb. 5th—Meeting of the Central Division, 10 Red Lion Square, W.C.1.

Feb. 6th—R.V.C. (London) College Dance, Hotel Russell.

Feb. 7th—Meeting of the Scottish Metropolitan Division at Edinburgh.

Feb. 11th—Annual General Meeting of the Lincolnshire and District Division at Grantham.

Feb. 13th—Annual Meeting and Dinner of the Midland Division at Birmingham.

ROYAL COLLEGE OF VETERINARY SURGEONS.

ANNUAL DINNER.

The Annual Dinner of the College has been fixed to take place at the Edward VII. Rooms, Hotel Victoria, Northumberland Avenue, W.C.2, on Thursday evening, July 2nd, at 7 p.m.

The Earl of Ypres has promised to attend, and it is hoped that Earl Haig will also be present.

Further particulars will be announced later.

The publication of the Official History of the Great War (Veterinary Services) has been delayed owing to the estimate of the cost of printing having been somewhat exceeded. It is hoped that the treasury will give early approval for the small extra expenditure.

Treasury approval was originally given for one volume of 700 pages, but it was not found possible to keep strictly to this limit.

The work, which was completed some weeks ago, consists of 750 pages excluding the index, and contains 31 chapters, with five appendices and about 30 plates.

GLASGOW VETERINARY COLLEGE.

At a meeting of the Finance Committee of Aberdeen County Council on January 16th, Mr. C. W. Sleigh, Stricken, presiding—an application was received from the secretary of the Glasgow Veterinary College Incorporated for a grant towards the funds of the College.

The Glasgow communication stated that the number of students was eighty-four, while, according to the Departmental Committee, the average at Edinburgh was about 200.

The Chairman said that they had a good deal of sympathy with the Glasgow College, which had done good work under great difficulties. In the face of that report, however, he did not think they could give public funds to that College, and he moved accordingly.

The Earl of Caithness seconded, and the motion was unanimously agreed to.

Liver Fluke.

There is ample evidence of an unusually severe epidemic of liver fluke, and as this disease is probably responsible for a higher mortality in sheep than any other, it might not be out of place to sound a note of warning regarding the treatment it is proposed to adopt.

For the past twenty-five years, perhaps longer, experiments have been made by scientists in Europe and America with male fern, known to be a powerful anthelmintic, especially effective against tape worms inhabiting the alimentary canal; but the universal outcome of such experiments has been that the large doses necessary to kill the flukes in the liver (which can only be reached through the circulation) proved, in most cases, lethal to the host, while smaller doses were ineffective. The subject is dealt with, among others, by Neumann in his *Parasites of Animals*. Professor Wooldridge recommended one dram of ethereal extract in one ounce of linseed oil on five successive days, whereas Froliner states that five drams killed a 40 lb. dog, and six drams an 88 lb. sheep. Professor Lander, in *Veterinary Toxicology*, maintains that linseed oil increases the toxicity of male fern. More recently Professor T. W. Cave, F.R.C.V.S., of the South-Eastern Agricultural College, Wye, writing on the subject in the *Agricultural Gazette* of the 7th November, 1924, affirms that it is "always a toss up" which the drug will kill—the parasite or the animal.

The researches of Professor Marek, of Vienna and Budapest, have, however, finally settled the controversy, and it has been definitely established by the Ministry of Agriculture and innumerable veterinary authorities, both here and abroad, that a male fern derivative, prepared according to his formula, is not only perfectly safe in use but wonderfully efficient, Marek having succeeded in separating the toxic elements in the drug.

Attempts are being made to substitute it, in the case in point, by the re-introduction of ordinary male fern extract. But it certainly seems inadvisable, in the light of past experience, that stock breeders should allow themselves to be induced, just on the very eve of a serious epidemic, again to try a discarded "remedy," the effect of which, to say the least, is doubtful, and might well be disastrous, this solely because the ordinary extract of male fern is common property, or on account of its cheaper initial, although certainly not ultimate, cost.

It has been proved beyond question that the toxicity of male fern extract is a very variable factor; equally so that Professor Marek's derivative is free from such toxic properties, first determined and fixed by him and extracted by a special process. It is said that, since its introduction in 1921, over five million sheep and a large number of cattle of all sizes have been successfully treated in this country and on the Continent, by means of Professor Marek's derivative (of which an announcement appears in our advertisement pages). This product can be obtained by veterinary surgeons direct from the British manufacturers.

FOOT-AND-MOUTH DISEASE.

The Ministry of Agriculture reported on Tuesday, that a fresh outbreak of foot-and-mouth disease was confirmed on Monday, on premises at Ovingdean, near Brighton, the stock on two holdings adjoining one another being affected. In one case five pigs out of thirty-one were found diseased; they are reported to have been purchased at Newhaven about three weeks ago. On the adjoining premises, seven cows of the total stock of nine cows were found affected.

A calf from the premises at Newhaven, from which the pigs were purchased was sent to Lewes market on Monday afternoon. The Ministry is taking all possible steps to prevent any spread of infection from this source.

A further outbreak of the disease was confirmed on Tuesday morning, on premises at Rottingdean, three miles from the above-mentioned cases. The stock here consists of seventy-one cattle, seventy-one pigs, and fifty-five sheep. One affected cow was purchased from the infected premises at Ovingdean on January 24th. The slaughter of all these animals is proceeding.

The Ministry has made an order imposing restrictions on the movement of animals within a radius of about fifteen miles of the premises at Ovingdean.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication

The Editor does not hold himself responsible for the opinions of his correspondents.

White Heifer Disease.

TO THE EDITOR OF THE VETERINARY RECORD.

SIR,—Thanks to the courtesy of the members of the Veterinary Profession, I have been enabled to examine several cases of white heifer disease. This work is part of an ambitious scheme of investigation into the causes of sterility that is now being organised by a committee representing the Veterinary Colleges and Agricultural Research Institutes in Scotland. In the cases examined, I found, greatly to my surprise, I have to confess, instead of ovaries, sex-glands that presented the typical structure of an undescended *testis*. This disclosure has made me more eager than ever to pursue the problem of the cause and nature of white heifer disease to the end. This cannot be done without the help of the widely scattered fraternity of veterinarians. I seek the courtesy of your columns in order to ask that I may be allowed to draw upon the

experiences of veterinary surgeons, and that I may receive specimens of this condition whenever it is encountered.

Am I correct in assuming that this abnormality is definitely more common in white cattle than in coloured? If it were as common in coloured cattle it would be common indeed, for there are so many more coloured than white. Is the condition clearly associated with white coat colour, or is its prevalence among white cattle merely a reflection of the fact that white is bred to white more commonly than to coloured? There is no question, I take it, that the abnormal white heifer is in any way a free-martin. The abnormal individual is not invariably a co-twin to a normal male? It is known that the sex-glands of the free martin may have a distinctly testicular structure. Is the abnormal white heifer an unquestioned female until her sterility calls attention to her fault? Is there any suggestion of a preputial area on the abdominal wall? (I find that in the sexually abnormal pig, there is invariably a preputial tuft of hair even though the external organs of reproduction may be quite female in type).

There are a dozen other questions (many of them doubtless appearing rather foolish) that I wish to ask, but they can wait. It will be sufficient if this appeal for help brings me into contact with those who have had experience of the condition. The problem cannot be solved merely by sectioning the sex-glands. Accurate details of the methods of breeding that produced the abnormal individual and intimate details of her life history are essential. From what is known of other forms of sexual abnormality, it would appear that the white heifer is either a female whose ovaries had become replaced by imperfect testes, or else perhaps even a male in which the processes of sexual differentiation had been rendered profoundly abnormal. It is more reasonable, at the present time, to favour the first suggestion.—Yours, etc., F. A. E. Crew.

Department of Genetics,
King's Buildings,
The University,
Edinburgh.
21*st January*, 1925.

The Anthrax Order of 1910.

To the Editor of The Veterinary Record.

Sir,—I read with interest Mr. Hugh Begg's letter in the *Record* of January 17th with reference to the above, and perhaps a little occurrence which took place in my practice some sixteen years ago will be of interest.

I was called early one morning by a small farmer in the district, who was a milk seller and had a good round, to a cow which had been discovered dead in her stall, hanging in the chain.

When I arrived, the owner began to recite his opinion as to the cause of death from the following history, which he told me with the intention of assuring me that all was well.

He had noticed this particular cow showing the following symptoms for at least three days: trembling, twitching of the skin, nervousness, eyesight affected, hair erect, kicking during milking, milk blood-stained. He had come to a "correct" diagnosis, that this cow had been standing with the others in a pond to cool herself, that her teats had been immersed in the water, and she had been struck by lightning in her udder. He had made a claim to the Insurance Co., and wanted a certificate from me as to the cause of death.

After paying close attention to this history, I enquired what he had done with the blood-stained milk, and was informed that he had delivered it in his rounds in one particular street, but when it had become too offensive he gave it to the pigs.

I then asked if he knew the particular people who had this milk, as this sample was in one can. Upon this he shewed annoyance, believing that his history had caused me to become suspicious.

I then went into the shippon to see the cow, and I told him that he would not get a certificate from me, and that the case must be reported at once to the police. This he refused to do, and called in someone else. I reported it myself to the police and they called in the Inspector for the district, an elderly gentleman, who came to see me. He told me that he did not like to declare anthrax, as the Board of Agriculture were now beginning to ask questions.

However, I discovered this was not his real reason, but that he had been asked by this particular farmer and his father not to declare it.

Eventually I made a microscopical slide for him, and showed him through the microscope anthrax bacilli, swarming, and I tried to explain to him the method of staining and the peculiarities of the methylene blue stain. He then found himself on the horns of a dilemma.

Three days afterwards all this farmer's pigs died from anthrax, and in the particular street where this milk had been delivered there appeared a disease of the skin, which looked like a skin spotted with smallpox just appearing. There were no less than six deaths, and these in the elderly people, but children, who seemed to stand it better, got over it. It left them, however, with red spots over the skin as large as shillings, just like a healing scar after a wound, but circular.

The deaths of these people were certified as due to infectious erysipilas, but I will leave my readers to form their own opinions.—Yours etc., H. Bibbey.

Winsford.

The Editor acknowledges the receipt of the following:—
Communication from Mr. Arthur New.

Journal of the American Veterinary Medical Association,

formerly

AMERICAN VETERINARY REVIEW.

(Original Official Organ U.S. Vet. Med. Assn.).

Edited and Published for the

American Veterinary Medical Association,

(H. PRESTON HOSKINS, *Secretary-Editor*),

735 Book Building, Detroit, Mich., U.S.A.

Price £1 1s. 0d. per annum,
POST FREE.

Subscriptions to N.V.M.A., 10 Gray's Inn Square, W.C.1., or direct to the publishers.

National Veterinary Medical Association of Great Britain and Ireland, Limited.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

Cheques should be made payable and all communications sent to the General Secretary at the Offices of the Association, 10 Gray's Inn Square, London, W.C.1.